Independent guide to the BBC MICRO!

THE MICRO USER

Volume 3
Number 1
March 1985
£1.25

Help celebrate our 2nd birthday!

WIN
a unique
customised
GOLD
BBC Micro!

Two great birthday games

Fight deadly QLcraft among the asteroids

Capture castles in two-player catapult combat

Four versatile utilities to:

Tame the Break key . . .
enter your data with ease . . .
give printers new characters . . .
simplify string searching on disc

SERIOUS SOFTWARE

FOR THE B.B.C. MICRO

From BEEBUGSOFT

SPELLCHECK II

NOW IN ROM and up to 500% faster.

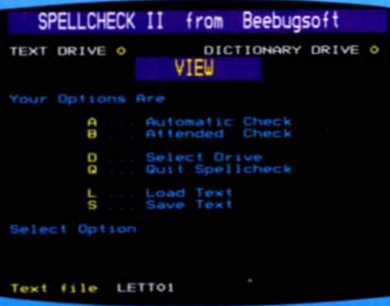
SPELLCHECK provides an automatic spelling check for letters or documents and is the ideal companion to WORDWISE or VIEW. It is menu driven, easy to use and allows unknown words to be added to the dictionary, ignored or re-spelt. A new corrected copy of the text may then be saved to disc.

SPELLCHECK I (On Disc)

SPELLCHECK I is supplied on two discs with a starting dictionary of 6,000 words. Separate versions are available for WORDWISE and VIEW. (When ordering please specify).

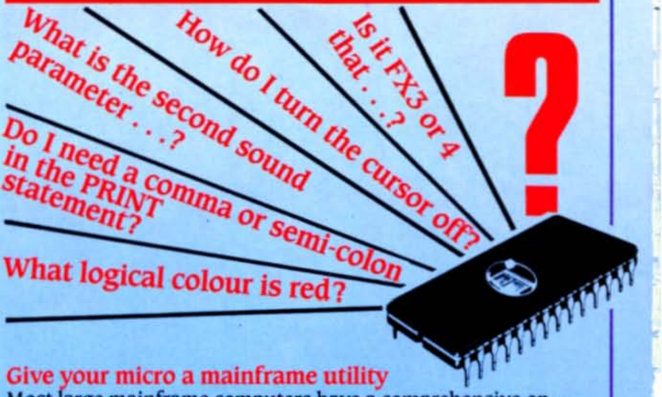
SPELLCHECK II (On Rom)

SPELLCHECK II is a completely new machine code program supplied in Rom. Operation speed is up to 5 times faster than SPELLCHECK I and larger pieces of text may be held in memory. The same version will also check both VIEW and WORDWISE. A dictionary disc is still supplied including 6,000 words, but a data compression technique is used to ensure that well in excess of 17,000 words may be stored on a 100K disc. Ingenious hashing and virtual file access routines have also considerably speeded up the time taken to check text. This sophisticated program is fully 6502 Second Processor compatible and uses the extra memory to further improve word retrieval time.



```
SPELLCHECK II  from  Beebugsoft

TEXT DRIVE 0             DICTIONARY DRIVE 0
                   VIEW

Your Options Are

        A ... Automatic Check
        B ... Attended  Check

        D ... Select Drive
        Q ... Quit Spellcheck

        L ... Load Text
        S ... Save Text

Select Option



Text file  LETT01
```

HELP ROM



What is the second parameter...?
How do I turn the cursor off?
Is it FX3 or 4 that...?
Do I need a comma or semi-colon in the PRINT statement?
What logical colour is red?
?

Give your micro a mainframe utility

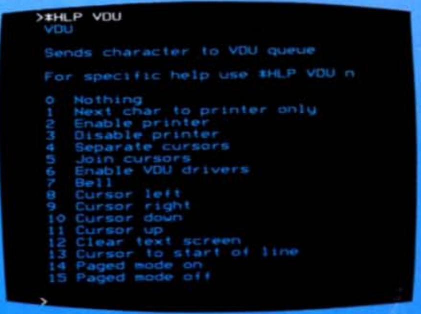
Most large mainframe computers have a comprehensive on-screen HELP facility to aid programming, save time and help you out when you get stuck. BEEBUGSOFT's new HELP Rom will give your micro a similar facility.

Just plug it in, and every time you get stuck for a VDU call, a colour code, the parameters for a Basic command or whatever: the HELP Rom will provide an instant answer.

Rather than wade through a book, simply type, for example, *HLPVDU (or just *H VDU) to find out all you need to know about VDU commands - or if you know that it is VDU23 that you want - type *H VDU23.

The HELP Rom uses an ingenious compression technique enabling some 14,000 characters of text to be squashed into an 8K eprom, and provides help on a vast range of subjects, including the following major areas:

BASIC KEYWORDS
MEMORY ALLOCATION
SCREEN MODES
SOUND
COLOUR
TELETEXT
VDU
COMMANDS
FX CALLS



```
>*HLP VDU
 VDU

 Sends character to VDU queue

 For specific help use *HLP VDU n

 0  Nothing
 1  Next char to printer only
 2  Enable printer
 3  Disable printer
 4  Separate cursors
 5  Join cursors
 6  Enable VDU drivers
 7  Bell
 8  Cursor left
 9  Cursor right
 10 Cursor down
 11 Cursor up
 12 Clear text screen
 13 Cursor to start of line
 14 Paged mode on
 15 Paged mode off

>
```

HELP will not affect the normal *HELP command

BEEBUG SOFT

SPELLCHECK II **£31**   HELP ROM **£25**

SPELLCHECK I **£19**

Available from your local dealer and selected branches of BOOTS

Prices include VAT

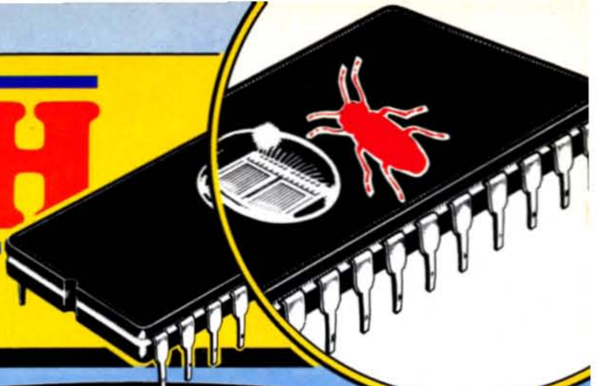
ACCESS & BARCLAYCARD ORDERS & ENQUIRIES:
TEL ST. ALBANS (0727) 60263

MAIL ORDER (POST FREE) TO: BEEBUGSOFT, Mailing Dept 16, P.O. Box 109, High Wycombe, Bucks.

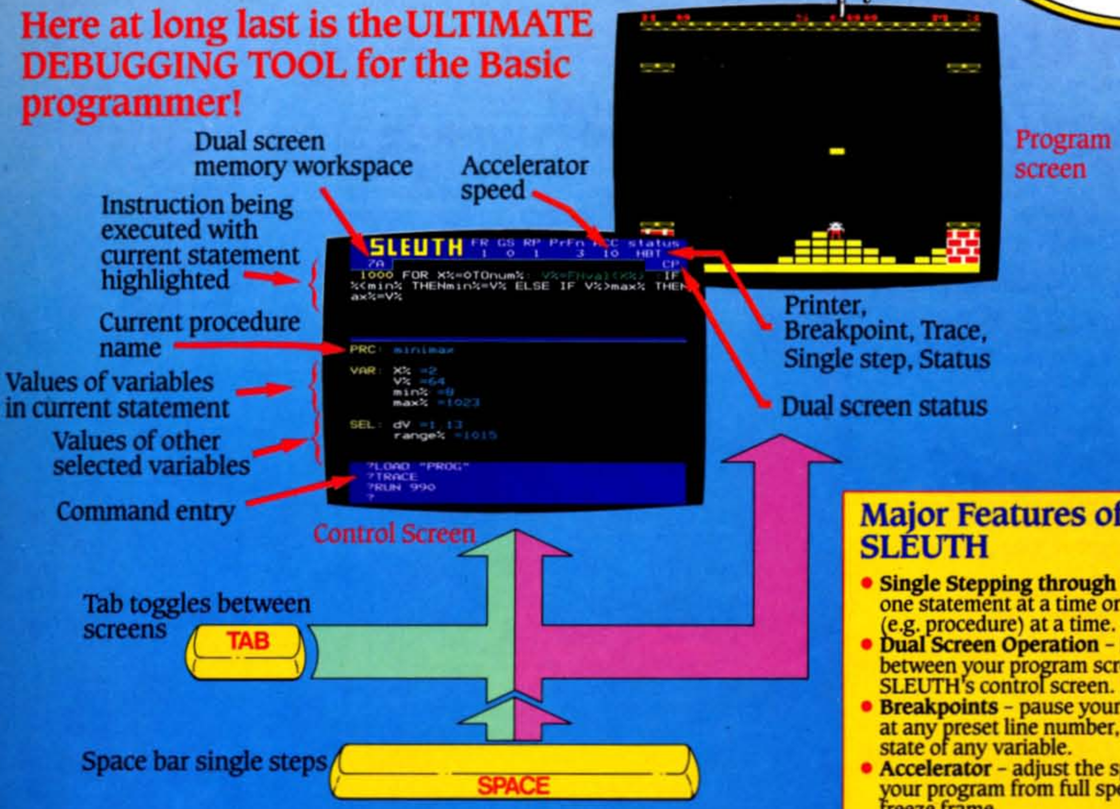
B.B.C. Micro

SLEUTH

Looking for bugs in your Basic?
Let Sleuth track them down.



Here at long last is the ULTIMATE DEBUGGING TOOL for the Basic programmer!


Dual screen memory workspace
Accelerator speed
Program screen
Instruction being executed with current statement highlighted
Current procedure name
Values of variables in current statement
Values of other selected variables
Command entry
Printer, Breakpoint, Trace, Single step, Status
Dual screen status
Control Screen
Tab toggles between screens
TAB
Space bar single steps
SPACE

```
SLEUTH FR GS RP PrFn ACC status
        1  0  1    3  10  HBT
  7A                           CP
 1000 FOR X%=0TOnum%: V%=FNval(X%) :IF
%<min% THENmin%=V% ELSE IF V%>max% THEN
ax%=V%

PRC: minimax

VAR: X%  =2
     V%  =64
     min% =8
     max% =1023

SEL: dV  =1.13
     range% =1015

 ?LOAD "PROG"
 ?TRACE
 ?RUN 990
 ?
```

SLEUTH allows you to single step through your Basic program instruction by instruction, watching your screen display as it is built up. Simply press the Space Bar to execute the next instruction. Alternatively you may watch SLEUTH's control screen as you step through your program. (Press Tab to toggle between your own screen and the control screen.) This will show you the next instruction to be executed and allow you to list any part of the program. Also displayed will be the contents of all variables associated with the current instruction and the values of other specified variables.
At any time you may alter the values of any variable or update memory. You can even change the line number of the next instruction to be executed or alter the logic within a program statement. Then simply press the Space Bar to watch the next instruction execute.
Breakpoints may also be set up at any position in your program, these allow you to speed to the problem area and then see exactly what's happening. You may even set conditional breakpoints. e.g. Stop IF A%=20.
Advanced trace and decelerator facilities are also included. The decelerator allows you to alter the speed at which your program executes, actually as it is running.
SLEUTH is ideal for the novice and expert alike and will prove to be instantly invaluable, saving hours of debugging time. In addition, the single stepping facility makes it a powerful teaching aid.

Major Features of SLEUTH

- **Single Stepping through Basic** – one statement at a time or a block (e.g. procedure) at a time.
- **Dual Screen Operation** – flip between your program screen and SLEUTH's control screen.
- **Breakpoints** – pause your program at any preset line number, or on the state of any variable.
- **Accelerator** – adjust the speed of your program from full speed to freeze frame.
- **Full Feature Control Screen** – monitor and update vital aspects of your program as it runs.
- **Trace** – a sophisticated line trace facility operating when program runs.

Control Screen Features

- Control screen entered at the press of a key.
- Select edit or single-step mode.
- Adjust program run speed (1-100%).
- View the current program line with the current statement highlighted.
- List the whole or any part of your program.
- Alter the next line number to be executed.
- Read and adjust the value of variables in the current statement.
- Read and adjust the values of any other specified variables or array parameters.
- Insert or remove breakpoints and conditional breakpoints.
- Return to the program screen or continue to single-step or to run at any speed.

BEEBUG SOFT

Price £29.00

TEL ST. ALBANS (0727) 60263

MAIL ORDER (POST FREE) TO: BEEBUGSOFT, Mailing Dept 16, P.O. Box 109, High Wycombe Bucks.

Independent guide to the BBC MICRO!
THE MICRO USER
WIN a unique customised GOLD BBC Micro!
Two great birthday games
Fight deadly QLcraft among the asteroids
Capture castles in two-player catapult combat
Four versatile utilities to:
Tame the Break key ... enter your data with ease ... give printers new characters ... simplify string searching on disc

Vol. 3 No. 1 March 1985

Managing Editor
Derek Meakin

Features Editor
Mike Bibby

Production Editor
Peter Glover

Layout Design
Heather Sheldrick

Associate Editor
Alan McLachlan

News Editor
Mike Cowley

Technical Editor
Mike Cook

Advertisement Manager
John Riding

Advertising Sales
Mike Hayes
Margaret Clarke

Editor in Chief,
Database Publications
Peter Brameld

Tel: 061-456 8835 (Editorial)
061-456 8383 (Administration)
061-456 8500 (Advertising)
061-480 0171 (Subscriptions)
Telex: 667664 SHARET G
Prestel Mailbox: 614568383

Published by:
Database Publications Ltd,
Europa House, 68 Chester Road,
Hazel Grove, Stockport SK7 5NY.

Subscription rates for
12 issues, post free:
£15 – UK
£15 – Eire (IR £18)
£20 – Rest of world (surface)
£65 – Rest of world (airmail)

ABC 68,328
January-June 1984

The Micro User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

© 1985 Database Publications Ltd. No material may be reproduced in whole or in part without written permission. While every care is taken, the publishers cannot be held legally responsible for any errors in articles, listings or advertisements.

The Micro User is an independent publication and neither the BBC nor Acorn Computers Ltd are responsible for any of the articles in this issue or for any of the opinions expressed.

News trade distribution:
Europress Sales and Distribution Limited, 11 Brighton Road, Crawley, West Sussex RH10 6AF. Circulation 0293 27053.

NEWS 23
Read all about it! All the latest events in the ever-changing world of your BBC Micro.

DISC SEARCH 46
It's on the disc, but you don't know where. Find it with this superb machine code utility.

SOFTWARE SCENE 53
Our fearless reviewers present their in-depth evaluation of all the recent releases.

PROBLEM PAGE 59
Our resident electronics guru turns his mind to 3in drives, screen shake and light pens.

CASTLE 72
Can you demolish your opponent's castle in this enthralling battle of the catapults?

6502 GAMES 74
We show how to create multi-coloured characters and move them around the screen.

ADVENTURES 80
Once again our frank columnist takes her critical look at the world of adventures.

BEGINNERS 89
Is string manipulation driving you round the bend? We'll show you how simple it can be.

ASTROMINES 102
Asteroid mining is always risky – it's even worse when you're plagued by QLcrafts.

DATA MAKER 106
Take the tedium out of entering data with this effective and extremely versatile utility.

110 **FIRST EDITION**
Make the most of your micro's sound and graphics with Micro User's first book!

115 **PRINTER CODES**
A superb routine to give your BBC Micro and Epson FX80 printer the same character set.

119 **FREEBIE**
Thwart the wizard and regain your DNA in a superb free extra to our tape/disc offer.

127 **COMMUNICATIONS**
A selection of hints, tips and machine code routines for the communications programmer.

130 **NETWORKING**
The coming information explosion – how it will affect modem-owning pioneers.

133 **BREAK KEY**
Disabling the Break key has its advantages. This useful utility shows you how to do it.

137 **HARDWARE SCENE**
Pixy 3 and BeePlot, Weno Buggy, Z80 Second Processor and Slomo under our spotlight.

147 **BODY BUILDING**
Let your Micro do the talking with Acorn's Speech synthesis ROM. Here's how to fit it.

167 **MICROMAIL**
The part of the magazine you write yourself – your news, views, ideas, praise and moans.

183 **ORDER FORM**
From back issues to binders, cassettes to cases, discs to disc covers – they're all here.

WE'RE
2
YEARS OLD

This issue marks the second birthday of *The Micro User*. Thanks to the enthusiastic support of our ever growing number of readers, in two years we have become the No. 1 magazine for BBC Micro users – and the fifth largest-selling of Britain's 124 computer magazines. And last month our total sales since we started reached a new milestone:

1½ MILLION COPIES!

To celebrate our birthday we've come up with a rather special contest – and some very attractive offers. See Page 94.

Building with BEASTY NEW

Beasty is a registered trade mark of Micro-Robotics, Cambridge, England. The Beasty System is made in England by Micro-Robotics.

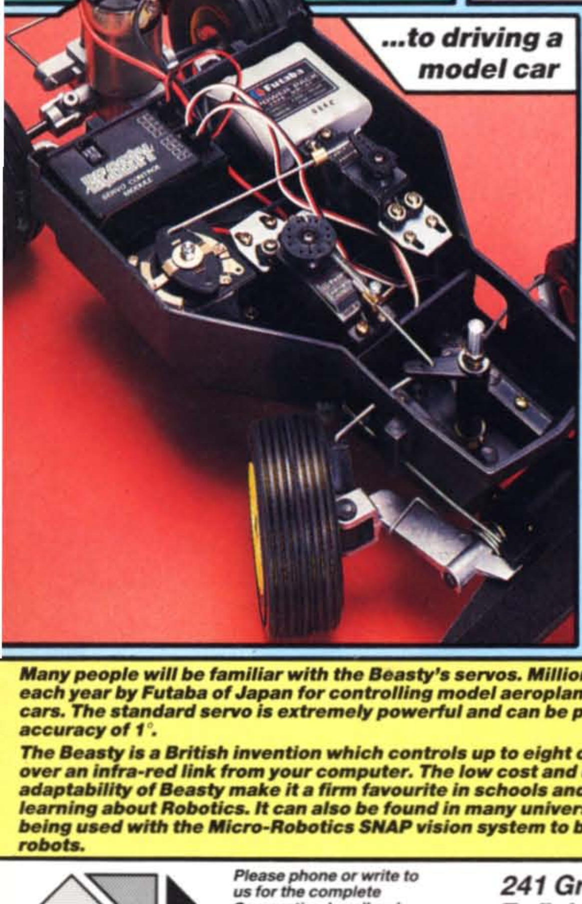
Explore the exciting world of Robotics with the new infra-red remote controlled Beasty. Beasty links your home computer to model cars, robot arms, construction sets and anything else you can dream up – how about a spider that walks?

Beasty can be linked to many construction sets,

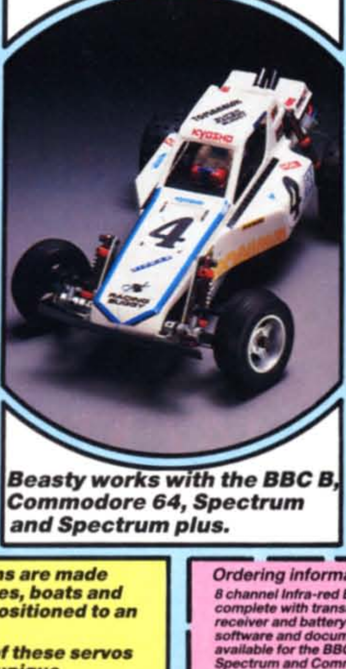
Beasty can do all sorts of things ...from typing

...to chemistry

...to driving a model car



this one does 30 MPH!



Beasty works with the BBC B, Commodore 64, Spectrum and Spectrum plus.

...to controlling TV's and videos replacing the remote control handset.

Many people will be familiar with the Beasty's servos. Millions are made each year by Futaba of Japan for controlling model aeroplanes, boats and cars. The standard servo is extremely powerful and can be positioned to an accuracy of 1°.

The Beasty is a British invention which controls up to eight of these servos over an infra-red link from your computer. The low cost and unique adaptability of Beasty make it a firm favourite in schools and at home for learning about Robotics. It can also be found in many universities where it is being used with the Micro-Robotics SNAP vision system to build 'seeing' robots.

Please phone or write to us for the complete Commotion handbook.

COMMOTION
COMPUTER OPERATED MOTION

241 Green Street,
Enfield, Middlesex
EN3 7SJ

Telephone:
01-804-1378

Ordering information

8 channel Infra-red Beasty complete with transmitter receiver and battery holder, software and documentation available for the BBC, Spectrum and Commodore 64.	P-BMIRB-BBC P-BMIRB-SPEC P-BMIRB-C64	£49.95 £49.95 £49.95	☐ ☐ ☐
4 channel Beasty inc. software, cable and documentation.	P-BMI-BBC	£29.95	☐
Standard Beasty servo	P-SP128	£14.50	☐
Beasty arm mechanism (3 servos and Beasty also required)	P-ARM1	£39.95	☐
Beasty model base	P-BASE1	£75.00	☐

All prices include VAT, P and P £1.25.
Export and Trade prices on application.

VISA Access

Name ______

Address ______

______

______ Post Code ______

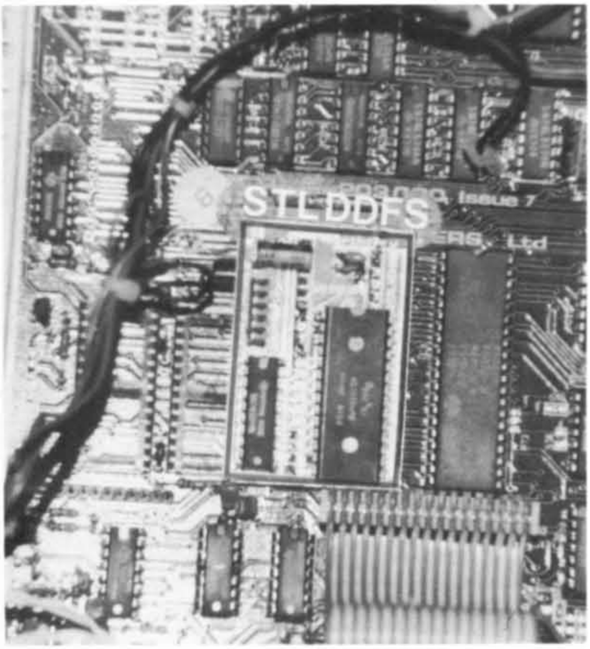
FROM SMALL ACORNS, SOLIDISK GROWS.

IN JULY 1983, we released the Sideways RAM for the BBC computer. We sold 5 in the first week, 10 in the second week, 20 in the third and one year later, we sell more than 500 in the UK and well more than 100 a week abroad.

By the time you read this, more than 30,000 Solidisk Sideways RAM boards will be beavering away in hundreds of schools and thousands of homes.

They are being joined by thousands of Solidisk DDFS each month. Soon, we hope, they will all be linked together by Solidisk Single Chip MODEM.

To support the users, a network of Solidisk Local Experts, covering the UK, Holland, France, Australia and Israel has been set up and expanding. Providing fitting and software for free.



SOLIDISK DOUBLE DENSITY DFS 1.5:
Single and Double Density.
Automatic Density Selection.
1 or Twin Drives, 40 and 80 Tracks, Single and Double Sided.
Automatic 40 and 80 Track Selection.
31 Filenames.
Low Cost.

SOLIDISK DOUBLE DENSITY DFS 2.0:
Virtually Unlimited Number of Filenames.
Automatic Tape to Disk.
Built-in Disk Fix and Disk Sector Editor.
Built-in Wordprocessor.
Does not Require DNFS With Z80 and 6502 Second Processors.

SOLIDISK SIDEWAYS RAM:
Add from 16k to 256k bytes of RAM to the BBC 32k RAM.
Useable for running Sideways ROM Software.
Useable in Networks or on BBC with Disk Drive(s).
Compatible With All Acorn Existing Products.
Including Econet, Teletext, 6502 and Z80 Second Processors.
Compatible With Most Sideways ROM Software.
Available Multi User Licencing Agreement from Leading Software Houses.
Easily Expandable as Your Needs Grow.
Low Cost.
Free Installation if Required.
Very large User Base, Extensive Free Software.
Local Help by Solidisk Local Expert Network.
Free Membership to receive Periodic Newsletters.

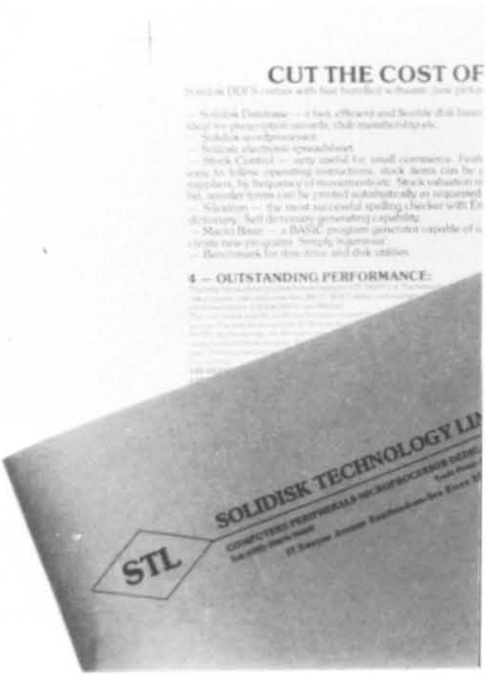
COMING SOON:
SOLIDISK is at present developing a state of the art MODEM. This will be compatible with the CCITT V23 and BELL 202 transmission standards at speeds from 5 to 1200 Bauds and will be based on the TMS 3105 single chip FSK MODEM manufactured by TEXAS Instruments.
The price is expected to be £39.95 inclusive of VAT.

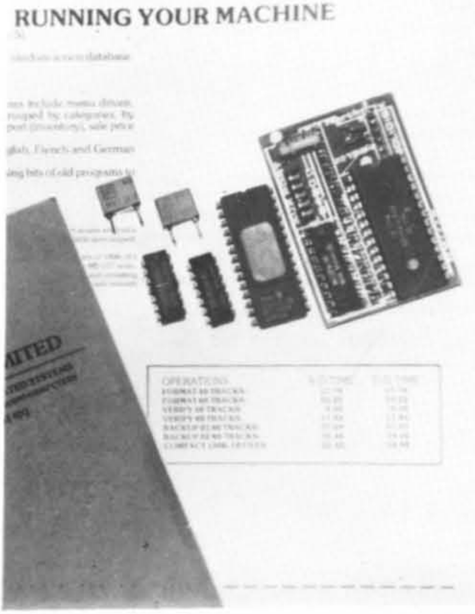
We need you and your help. To make Solidisk Users the largest BBC Users Group. To share good ideas and good ways to use them.

SOLIDISK TECHNOLOGY, 17 SWEYNE AVE, SOUTHEND-ON-SEA, ESSEX
TEL. (0702) 354674 (10 lines).

HAVE YOU ALREADY GOT DISK DRIVE(S) FOR YOUR BBC COMPUTER?

OPERATIONS	S/D TIME	D/D TIME
FORMAT 40 TRACKS:	**17.74**	**17.74**
FORMAT 80 TRACKS:	**33.22**	**33.22**
VERIFY 40 TRACKS:	**9.30**	**9.30**
VERIFY 80 TRACKS:	**17.84**	**17.84**
BACKUP 01 80 TRACKS:	**37.69**	**37.69**
BACKUP 02 80 TRACKS:	**39.46**	**39.46**
COMPACT 100K-10 FILES	**22.42**	**18.82**





THE SOLIDISK DOUBLE DENSITY DFS

If you take your Disk Systems seriously then there are very few viable alternatives to our new Double Density Filing System.

Anyone, with their ear to the ground, will probably have heard of the great shortage of the 8271 Floppy Disk Controller chip. This chip is, of course, the basis of all single density DFS upgrades for the BBC Microcomputer and is used extensively by Acorn, AMCOM and Watford Electronics in their respective DFS's.

This shortage can mean long delays or paying much inflated prices to obtain your Disk Upgrade.

Now, however, we at SOLIDISK have developed an alternative system with many advantages over the 8271 based upgrades. Not the least of these being continuation of supply of the FDC chip (Western Digital 1770) but, also, improvements in the speed and versatility of operation.

EASY TO INSTALL

The SOLIDISK DDFS comes complete with an easy to follow manual with step by step installation instructions, and can be fitted in just a few minutes by anyone with just the barest knowledge of the insides of their BBC.

The DFS contains just 4 IC's and 2 jumpers to be inserted and one link to be cut in the computer. This is compared to the usual upgrades which require 11 IC's to be fitted and the link to be cut.

EASY TO USE

The SOLIDISK DDFS Revision 1.5 contains many time and labour saving features. These include formatter, verifier, automatic density sensing, automatic 40/80 track switching and Single/Double Density mass copying etc.

COMPLETE CONTROL OVER THE DISK

SOLIDISK DDFS gives you complete control over your disk drive(s). You can use any combination of Single/Double Density, 40 or 80 tracks in one or two disk drives.

Every time the SOLIDISK DDFS accesses the disk it detects the density and the disc size in use and acts accordingly.
You can for example copy from a 40 to an 80 track disc on the same 80 track disk drive or even format a 40 track disk in an 80 track drive using the automatic disc size sensing in the DDFS. It is also possible to have one side of a disc formatted in Single Density and the other side in Double Density. Also copying between different densities is coped with automatically and, when using twin drives, is very fast.

GREATER DISC CAPACITY

When formatting a disk with the SOLIDISK DDFS you have a choice of the usual Single Density or the increased capacity Double Density.

Formatting in Single Density will leave your disk compatible with all other Single Density systems. However if the disk is formatted in Double Density it will have a 60% greater capacity than the equivalent size Single Density disk. This means that on an 80 track disk that the capacity is increased from the usual 400 kbytes to 640 kbytes of storage. The Double Density Format used is, at present, unique to the SOLIDISK DDFS and provides 16 sectors per track as opposed to the usual 10 sectors in Single Density giving a 40% saving in media surface for a file of given length over Single Density.

INCREASED SPEED OF OPERATION

As mentioned previously a disk formatted in Double Density uses about 40% less disk space per given length of file than does a disk formatted in Single Density or alternatively it holds 60% more information per track. This allows the, already fast, SOLIDISK DDFS to run very fast in the Double Density mode as demonstrated in the benchmark test on the next page.

BENCHMARK OUTSTANDING PERFORMANCE:

The table below shows the benchmark timing for STL DDFS 1.4. The benchmark consists of disk operations such as save and load a 16k program, open and close files, BPUT, BGET strings and numbers, format and verify a disk etc., and is available upon request, otherwise listed in Solidisk DDFS User Manual.

The benchmark tests B1 to B9 are the same as used by many reviewers. The time is expressed in seconds and parts of 100th of a second. The disk drives are twin 40/80 track double sided MITSUBISHI M4853, the diskettes are Verbatim Datalife MD 557 series, 96 TPI, double density, double sided, pre-verified to ensure that the media is free of all error and mechanical defects and containing solely the benchmark program. The test is loaded into memory, the drive motors are allowed to stop completely 2 seconds between tests, 10 timing samples are taken and the mean time is calculated automatically.
For example:

```
100 DEFFNb1:REM Save a 16k program.
110T% + TIME
120 *SAVE A 8000 +4000
130 + TIME — T%
```

Full listings are included in the User Manual.
This FN is called 10 times with 3 sec. interval, the mean result is printed as 'B1'.

BENCHMARK DESCRIPTION	S/D TIME	D/D TIME
B1 Save 16k	**2.62**	**1.43**
B2 Load 16k	**2.45**	**1.23**
B3 Openin and close 100 times	**20.70**	**20.16**
B4 Openout and print 1000 numbers (255)	**5.84**	**4.66**
B5 Openin and input 1000 numbers (255)	**4.72**	**4.14**
B6 Openout and print 100 80 bytes strings	**6.18**	**4.91**
B7 Openin and input 100 80 bytes strings	**4.90**	**4.31**
B8 BPUT 100 bytes (255)	**3.01**	**2.06**
B9 BGET 1000 bytes (255)	**1.88**	**1.52**

Note 1: Whenever a file is to be opened, STL DDFS automatically refreshes the disk directory, thus preventing erroneous disk change. Many other DFS's do not take the same care, although yielding a much shorter time, and this could accidentally stop the program.

OPERATIONS	S/D TIME	D/D TIME
FORMAT 40 TRACKS:	**17.74**	**17.74**
FORMAT 80 TRACKS:	**33.22**	**33.22**
VERIFY 40 TRACKS:	**9.30**	**9.30**
VERIFY 80 TRACKS:	**17.84**	**17.84**
BACKUP 01 80 TRACKS:	**37.69**	**37.69**
BACKUP 02 80 TRACKS:	**39.46**	**39.46**
COMPACT 100K 10 FILES	**22.42**	**18.82**

With Wordwise:
Load 2000 words (17811 bytes) 16.80 sec. (41.40 sec. with AC).
With Scribe:
Count 2000 words (17811 bytes) 4.20 sec. (9.80 sec. with AC.90 DFS)
With Beebug's Masterfile:
Sort records 1 to 20 in PEOPLE sample database, the database is presorted on field 2 then the program is asked to sort on field 1, the time is then taken: 56.23 sec. (127.86 sec. with AC.90 DFS).
These timings are improved even further in double density mode.

The figures speak for themselves.

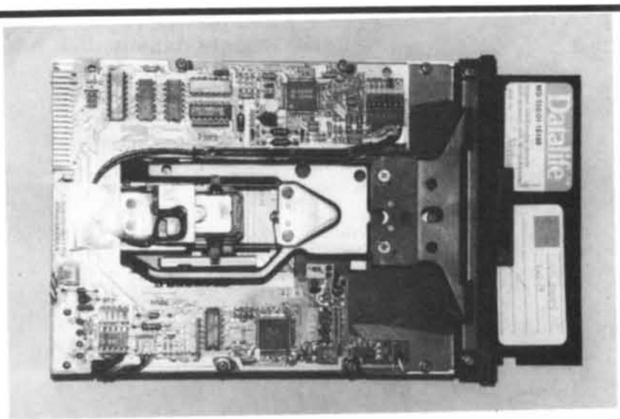
STL DDFS dramatically increases the operating speed of your software, including wordprocessors like Wordwise, View, Scribe, databases like Masterfile, Starbase etc.

Solidisk engineers won't stop there.

MITSUBISHI DISK DRIVE:
From the new VLSI ultra quiet auto spin-up series comes the MITSUBISHI M4853. We have chosen it for its speed, quiet performance, low power consumption and state of the art design — look at the following features:
— new developments by Motorola and Mitsubishi largely reduce the area taken up by electronics, leaving more room for the diskette. This in turn implies lower noise levels and reduced friction on diskettes.

8 Slim 5.25" half height model attractively cased in BBC micro beige
— Reliability; we find that Mitsubishi compares most favourably with other makes
— Use your BBC own power supply —
— Single and double density available, plus ability ro read 40 track diskettes formatted elsewhere when used with our DFS.

Of course, we don't need to mention that all drives come complete with Dual leadds letting you add instantly a second disk drive and manual together with full guarantee on parts and labour.



EXTRA FEATURES OF SOLIDISK DDFS 2.0

With the production of the SOLIDISK DDFS 2.0 ROM we raise the already high standard of the previous DDFS 1.5 ROM.

The larger memory capacity of the DDFS 2.0 has allowed inclusion of a Wordprocessor and complete Disk Toolkit as well as a totally new concept in the working of the Disk Directory.

This will, we feel, make the SOLIDISK DDFS 2.0 ROM the most powerful Disk System currently available.

1) EXTENDED NUMBER OF FILENAMES

The standard number of filenames on the BBC microcomputer is limited to 31on most Single Density DFS's. This usually presents no problem on a system using 40 track drives but when using either 80 track drives and/or a Double Density Filing System this number will quite often be reached with a lot of the disk space still unused.

The SOLIDISK DDFS 2.0 ROM uses a unique and novel way to circumvent this shortcoming as every time a catalogue becomes full a new one is created. This gives the possibility of having up to 1502 filenames on a normal 80 Track Double Sided disk. Even with this large number of filenames worst case access taking only just over 2 seconds. Obviously with large files and a lesser number of filenames the access time decreases dramatically.

The way that the DDFS 2.0 ROM operates means that ordinary single catalogue discs are completely compatible with our system and, indeed, will be upgraded to multi catalogue once the number of filenames exceeds 31. This means no special formatting is necessary and that the disc remains compatible with other Single Density DFS's.

2) DISK TOOLKIT

Included on the SOLIDISK DDFS 2.0 ROM is a powerful disk repair facility. It is possible to read a complete track into memory and to repair or modify the data before restoring the track to the disk. If only one sector needs to be worked on then this too is possible with the Disk Sector Editor contained in the DDFS 2.0.

A powerful Disk Copy routine is also included to allow mmost non-standard format disks to be duplicated. This routine will also displaay the Sector I.D. Fields so that it is possible to see the makeup of the track being copied.

3) WORDPROCESSOR:

SOLIDISK DDFS 2.0 ROM contains a Word Processor with many excellent features such as 80 column screen, automatic on screen justification, Search and Replace, Block Move and Copy etc.

SOLIDISK+MITSUBISHI BIG DEAL:

This is exactly what you would receive:

— one double sided 80 track Mitsubishi M4853 disk drive, cased in beige.
— one Solidisk Double density disk interface (complete with STL DDFS 1.5 ROM) as described overleaf, giving a total capacity of 640K.
— Dual leads and instruction manual.
— 5 Software Diskettes containing a selection of the most prestigious programs written for the BBC.
— full one year guarantee.
—all for £209.95 including VAT and post and packing.

THE HARDWARE:
As described earlier and opposite.

THE SOFTWARE:
A selection of 6 programs based on ease of use, and popularity. All efforts are made so that you would not have to read the manual twice.
All programs feature on screen help (word processor) or option menus throughout. Mode 3 is used throughout whenever possible for good visual representation.

— Solicalc —
A Disc Based electronic spreadsheet made only possible with the speed of Solidisk DDFS. The sheet size can be as big as 170 kbytes. Written in modules, it is easily upgradable. Mode 3 screen. Goto, Calculate, Replicate, Automatic Header etc.

— Solidisk Datafile —
A fast, efficient and random access Database. Solidisk Datafile features:
— Compact size.
— 80 column screen throughout.
— 15 fields of 60 characters per card.
— Unlimited number of cards.
— Powerful Screen Editing allowing VERY FAST data entry on new cards or data correction on old cards.
— All Maths functions on ALL fields admitting Symbolic Variables (like A, B, C, D etc) for entering formulae.
— Special SORT program making use of any free disk space to avoid swapping cards.
— Standard options include View, Print using Tabulation, Print Labels, Search on any number of criteria and repeat on count, Amend, Create, Spool to disk, Append and Mailmerge with Solidisk Word Processor (requires EPSON compatible printer).
— Ability to read BEEBUG's Masterfile and possibly other systems later on.

— Solidisk wordprocessor —
On screen help, Wordstar style cursor editing and control keys, on screen justification while you type, Block commands, Quick commands and dot commands for mailmerge. Future development will allow reading Wordstar text from the Z80 second processor. Solidisk can offer Laser Typesetting and Page Planning service: it costs you only £1.00 for typesetting 1×A4 page (around 4,000 characters) from disk received by MODEM.

— Stock control —
useful for small businesses. Features include menu driven, easy to follow instructions, easy categorising. Stock evaluation reports and inventories, together with price lists and reorder forms can be printed automatically as requested.

— Silexicon — the most successful spelling checker with English, French and German dictionaries, together with self generating capability.

— Macrobasic —
a BASIC program generator capable of using bits of old programs to create new ones. Clever ideas — clever ideas of making them work!

Please note that this software is only free as prt of the package deal. It is otherwise avaiable at a cost of £14. Customers who would prefer the DFDC version of our disk filing system (see earlier) can purchase the package deal with this option for an extra £10.
What we may need to tell you is that the price is also agreeably low — check what we offer against any of our competitors — which all adds up to a high degree of sophistication affordable to students and businessmen alike.

RING SOUTHEND (0702) 354674 (10 lines)

We shall endeavour to dispatch Disk Offer orders by credit card within 48 hours.

SOLIDISK LOCAL EXPERTS

We have local people able to fit your equipment FREE OF CHARGE in all of the following towns. If your area is not mentioned ring the office!

BASILDON
BEXLEY
BIRMINGHAM
BOSTON
COVENTRY

HODDESDON
KINGSTON
LEIGHTON BUZZARD
LIVERPOOL
LONDON

NEW MALDEN
NEWTOWNARDS

NOTTINGHAM
PETERBOROUGH
READING
SHEFFIELD

TODDINGTON
WARDLE
WANTAGE
WIMBORNE
WOKING
WALES

PRICE LIST — INCLUDES VAT & P&P

SIDEWAYS RAM:	£
SWR16 16K ADD-ON	43.65
SWR32 32K ADD-ON	59.95
S/D128 128K ADD-ON	150.95
S/D256 256K ADD-ON	N/A 256.00
EXTENSIONS:	
16-32K FULL EXCHANGE	19.00
16-128K FULL EXCHANGE	110.00
32-128K	95.00
SOLIDISK DFS:	
STL DDFS DISK UPGRADE	39.95
STL DFDC (goes with Acorn DFS)	49.95
DISK DRIVES:	
MITSUBUSHI 2×80 (INC LEADS	163.00
MITSUBUSHI TWIN + MANUAL)	323.00
COMPLETE SYSTEMS: (ie. DRIVES + DDDFS)	
MITSUBISHI 2×80	200.99
MITSUBISHI TWIN	353.00
CPU	
65-C-02 CHIP	12.00
65-C-02+ SOFTWARE	14.00
EPROM EQUIPMENT	
2764 CHIP	8.00
5 × 2764 PACK	36.00
3 × 27128 PACK	39.95
EPROM PROGRAMMER	20.95
EPROM ERASER — UVIPAC	20.95
DATALIFE DISKS	
MD525 SS/DD 40TRK	17.00
MD550 DS/DD 40TRK	23.00
MD577 SS/DD 80TRK	23.00
MD557 DS/DD 80TRK	29.00
WAB M16A DS/DD 80TRK	24.00
SANYO COLOUR MONITORS	
14" — NORMAL RESOLUTION	210.00
MEDIUM RESOLUTION	310.00
HIGH RESOLUTION	410.00
EPSON PRINTERS	
RX80 MATRIX PRINTER	248.35
RX80FT MATRIX PRINTER	282.85
FX80FT MATRIX PRINTER	386.35
BBC PRINTER CABLE	9.00
ELECTRON DISK INTERFACE	40.95
Typesetting per A4	1.00

TO: SOLIDISK 17 SWEYNE AVENUE SOUTHEND-ON-SEA ESSEX SS2 6JQ
Please send me:

QUANTITY	ITEM	TOTAL
....	....	£............
....	....	£............
....	....	£............

MY BARCLAY/ACCESS CARD NO. IS ....

NAME: ....

ADDRESS: ....

....

VOLUME DISCOUNTS AVAILABLE — PHONE SALES OFFICE (0702) 354674 (10 LINES)

All prices correct at time of going to press and subject to change without notice.

INTRODUCING THE DFDC!

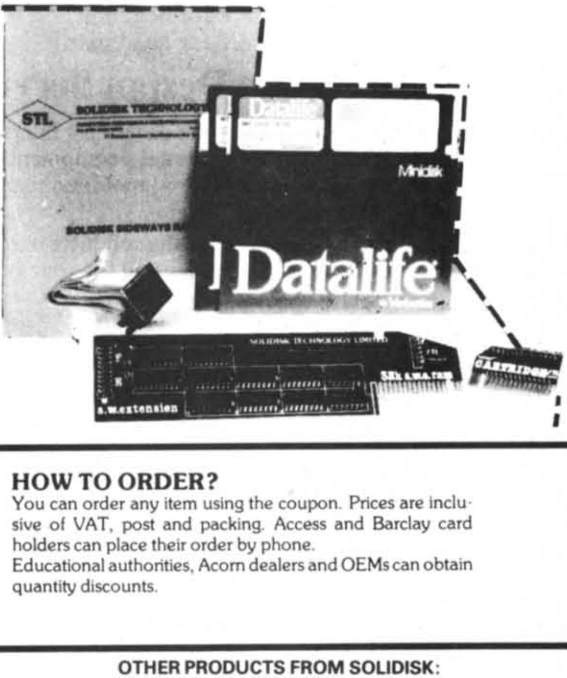
For those who already have the Acorn DDFS installed in their computer and would like the advantages of increased speed and storage capacity that Double Density systems offer SOLIDISK have introduced a totally new concept in the shape of the DFDC!

The DFDC board simply sits in place of the 8271 FDC, this being reinstalled in the DFDC boaard. Now all that needs to be done is to install the DDFS ROM into a Rom Socket, to the right of the existing Acorn DFS, and two other minor connections.

Great Value at £49.95 inc.

HAS YOUR BBC COMPUTER GOT ITS SIDEWAYS RAM BOARD YET?

"Break the Ram Barrier" (A&B)

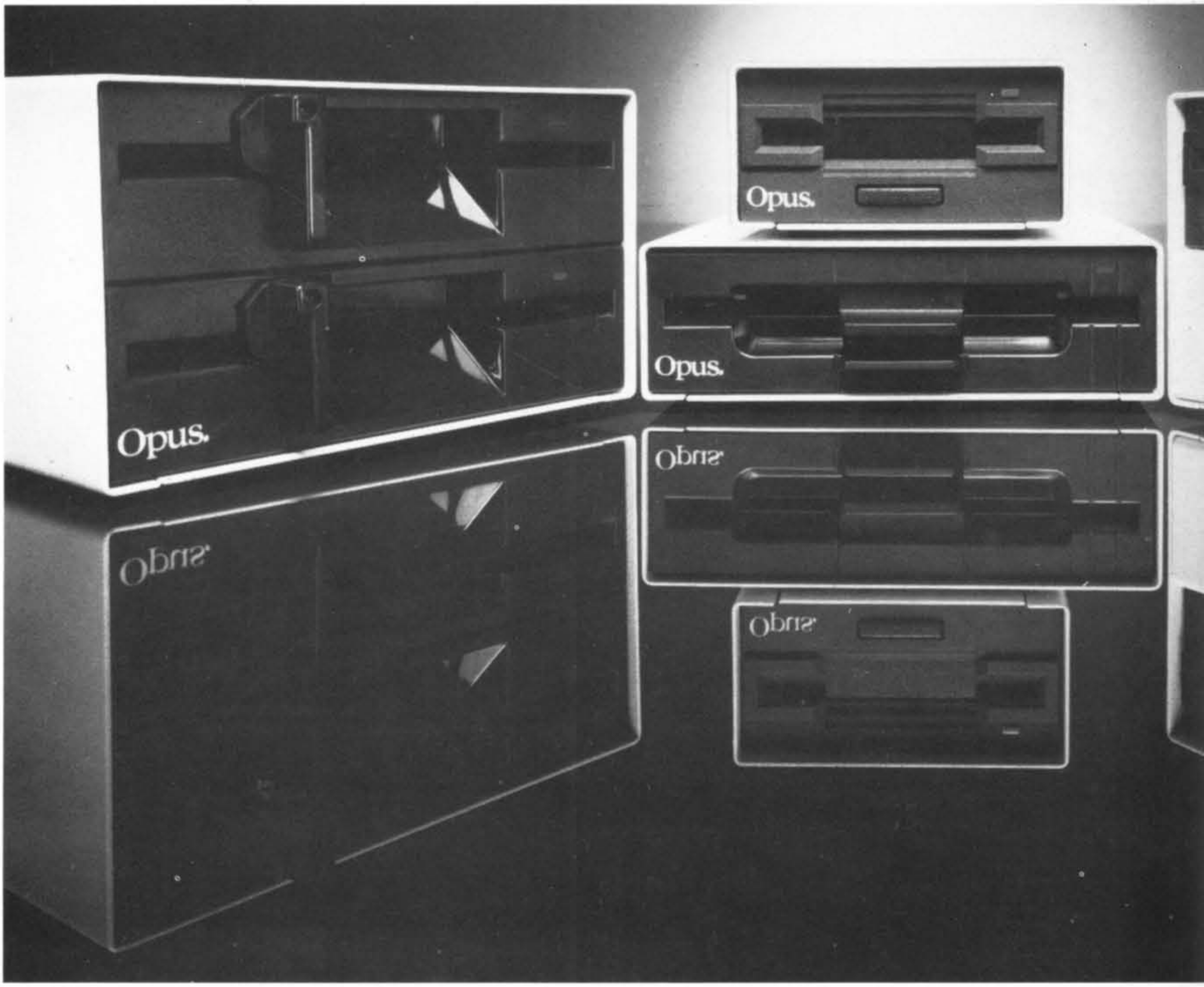


HOW TO ORDER?

You can order any item using the coupon. Prices are inclusive of VAT, post and packing. Access and Barclay card holders can place their order by phone.
Educational authorities, Acorn dealers and OEMs can obtain quantity discounts.

OTHER PRODUCTS FROM SOLIDISK:
UVIPAC EPROM ERASER:

PREMIER PERFO
NATIONWIDE



The quality of Opus disc drives has always been held in high regard.

Nowhere more than at Cambridge University.

It was their Computer Laboratory who selected Opus after evaluating many other makes of disc drives.

They were selected because of their competitive prices, reliability and quality of after-sales service.

And all the drives have been tested to the limit – running for 8,000 hours. That's a year of constant use without failure.

They can be bought as single or dual drive and vary from 100K to 1.6 Megabyte, catering for the beginner to a tutor requiring a system for the largest of classroom networks.

All this is backed up by a two year guarantee on every drive – a year more than any other company can offer.

5¼" SINGLE DISC DRIVES.

5400 100K Single sided 40 Track	**£119.95**
5401 100K Single sided 40 Track	**£149.95**
5402 200K Double sided 40 Track	**£169.95**
5802 400K Double sided Hardware switchable 80/40 Track	**£199.95**

RMERS MAKING APPEARANCES.

5¼" DUAL DISC DRIVES.

5401DB 200K/400K 40 Track	£319.95
5402DB 400K/800K 40 Track	£369.95
5802DB 800K/1.6 Megabyte 80/40 track	£399.95

5¼" DUAL DISC DRIVES WITH POWER SUPPLY.

5401D 200K/400K on line Single sided 40 Track	£349.95
5402D 400K/800K on line Double sided 40 Track	£399.95
5802D 800K/1.6 Megabyte on line Double sided hardware switchable 80/40 Track	£429.95

You can find Opus products by just making an appearance at one of the retailers listed opposite. Alternatively, you can contact us for the address of your nearest stockist. Opus Supplies Ltd., 158 Camberwell Rd., London SE5 0EE. Tel: 01-701 8668, 01-703 6155.

Opus.
Opus Supplies Ltd.

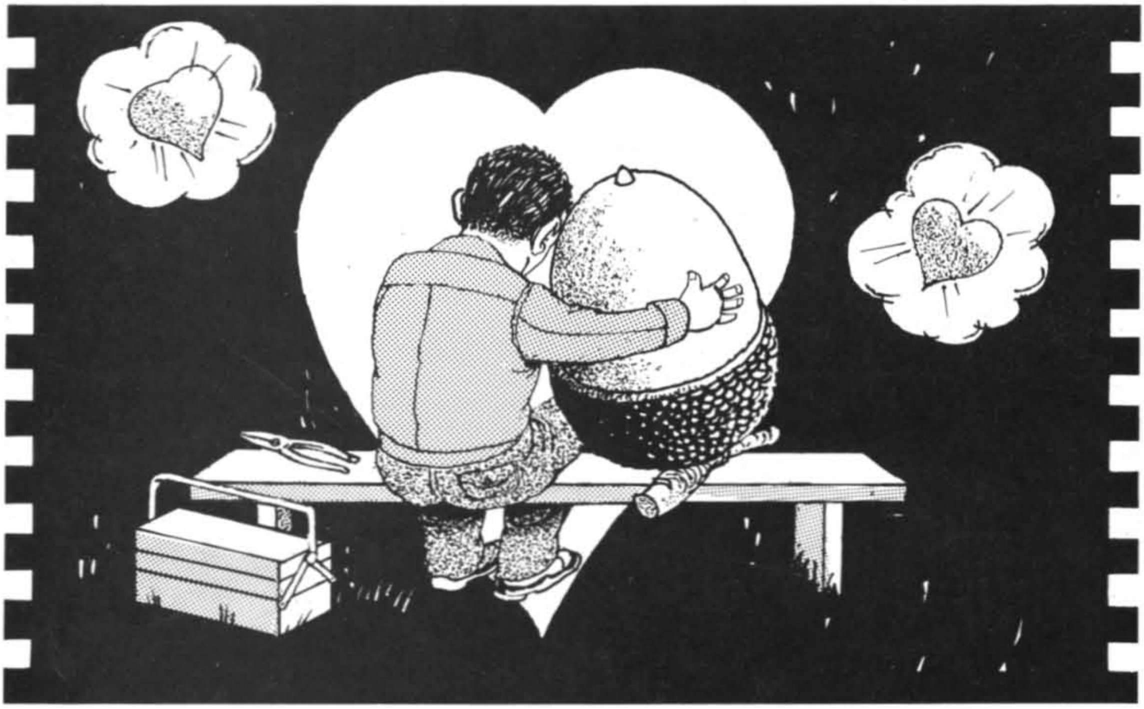
RETAIL OUTLETS

AVAILABLE AT BOOTS STORES IN THE FOLLOWING TOWNS:

ABERDEEN
ALTRINCHAM
ASHFORD, Kent
ASHTON-UNDER LYNE
AYLESBURY
AYR
BALLYMENA
BARNSLEY
BASILDON
BASINGSTOKE
BATH
BEDFORD
BELFAST
BEXLEYHEATH
BIRMINGHAM
BLACKBURN
BLACKPOOL
BOGNOR REGIS
BOLTON
BOSCOMBE
BOSTON
BOURNEMOUTH
BRADFORD
BRIDGEND, Mid Glamorgan
BRIDGWATER
BRIGHTON
BRISTOL
BROMLEY
BURNLEY
BURY
BURY ST. EDMUNDS
BURTON-ON-TRENT
CAMBRIDGE
CARDIFF
CARLISLE
CHATHAM
CHELMSFORD
CHELTENHAM
CHESTER
CHESTERFIELD
COLCHESTER
COVENTRY
CRAWLEY
CROYDON
DARLINGTON
DARTFORD
DERBY
DEWSBURY
DONCASTER
DUMFRIES
DUNDEE
DURHAM
EASTBOURNE
EAST KILBRIDE
EDINBURGH
ENFIELD
EXETER
FALKIRK
FAREHAM
FOLKESTONE
GATESHEAD
GLASGOW
GLOUCESTER
GRANTHAM
GRAVESEND
GREAT YARMOUTH
GRIMSBY
GUILDFORD
HALIFAX
HAMILTON
HANLEY
HARROGATE
HEMEL HEMPSTEAD
HEREFORD
HIGH WYCOMBE
HORSHAM
HOUNSLOW
HUDDERSFIELD
HULL
ILFORD
INVERNESS
KEIGHLEY
KETTERING
KING'S LYNN
KIRKCALDY
LANCASTER
LEAMINGTON SPA
LEEDS
LEICESTER
LINCOLN
LIVERPOOL
LLANELLI
LONDON
Brent Cross Shopping Centre
Hammersmith
Kensington High St.
Lewisham High Street
Piccadilly Circus
Regent Street
Wood Green Shopping City
LOUGHBOROUGH
LOWESTOFT
LUTON
MACCLESFIELD
MAIDENHEAD
MAIDSTONE
MANCHESTER
MANSFIELD
MIDDLESBROUGH
MILTON KEYNES
NEATH
NEWBURY
NEWCASTLE-UPON-TYNE
NEWCASTLE-UNDER-LYME
NEWPORT, Gwent
NEWPORT, I.O.W.
NORTHAMPTON
NORWICH
NOTTINGHAM
OLDHAM
ORPINGTON
OXFORD
PERTH
PETERBOROUGH
PLYMOUTH
PONTYPRIDD
POOLE
PORTSMOUTH
READING
ROCHDALE
ROMFORD
ST. ALBANS
ST. HELENS, Merseyside
ST. HELIER
SALISBURY
SCARBOROUGH
SHEFFIELD
SHREWSBURY
SLOUGH
SOUTHAMPTON
SOUTHEND ON SEA
SOUTHPORT
STAFFORD
STEVENAGE
STIRLING
STOCKPORT
STOCKTON ON TEES
STOURBRIDGE
SUNDERLAND
SUTTON, Surrey
SUTTON COLDFIELD
SWANSEA
SWINDON
TAUNTON
TELFORD
TRURO
TUNBRIDGE WELLS
UXBRIDGE
WAKEFIELD
WALSALL
WARRINGTON
WATFORD
WELLINGBOROUGH
WEST BROMWICH
WESTON SUPER MARE
WOKING
WOLVERHAMPTON
WORCESTER
WORTHING
WREXHAM
YEOVIL
YORK

ALLDERS, SPECTRUM GROUP PLC, JOHN MENZIES, CARDIFF MICRO COMPUTERS LTD, ELTEC, OAKLEAF COMPUTERS AND OTHER GOOD COMPUTER DEALERS NATIONWIDE.

WE LOVE YOUR ACORN TOO



RCS Computer Services are the main service centre for the Acorn Computer, it is fully equipped to undertake a comprehensive range of services.

★ WARRANTY/GUARANTEE ★

If your computer (BBC or Electron), B/W Monitor, cassette recorder or disk drive as supplied by Acorn becomes defective within the warranty period, RCS Computer Services are authorised to carry out the repair and return the equipment free of charge. All charges in this connection being paid by Acorn Computers.

★ EXTENDED GUARANTEE/ANNUAL MAINTENANCE CONTRACTS ★

The experience of RCS Computer Services allows us to offer a comprehensive guarantee extension or annual maintenance contracts at competitive prices, this applies not only to the standard Acorn product by also to a range of approved peripherals including printers, colour monitors etc.

★ UPGRADES ★

Supply and installation of upgrades such as DFS, Econet, Teletext etc. can be carried out quickly, efficiently and professionally by trained staff at our Service Centre.

★ SYSTEM INSTALLATION ★

Supply and installation of Econet Systems can be arranged and fully commissioned.

RCS COMPUTER SERVICES

Enterprise House
Central Way
North Feltham Trading Estate
Feltham, Middlesex TW14 0RX
Tel: 01-844 1333/1200. Tlx: 916581 LDATA

LEADERS OF THE PACK

CUB 452 is the most popular 14" standard resolution range of colour monitors available.

Why? Well, the 452(H) x 585(V) tube resolution eliminates disappointing colour reception and poor character definition associated with domestic TV's and other colour monitors. Optimum compatibility means owners of BBC, ORIC 1, ATMOS, ACORN ELECTRON, RML 480Z and many others can plug in and they're in business. Amazingly, CUB 452 is the only colour monitor to interface directly with the SINCLAIR SPECTRUM.

Then there's CUB RGB/PAL, the one that really sets us apart from the others. This continues CUB's revolutionary advance in high performance colour displays by producing brilliant images when used with a micro computer. Yet RGB/PAL also produces the highest quality pictures from LASER DISCS, VCR's and VIDEO CAMERAS. Add to this an audio facility, plus display of all TV broadcast channels when used with a VCR and the result is a versatile colour monitor which sounds as good as it looks. RGB/PAL is compatible with BBC(A&B), COMMODORE 64, APPLE series, DRAGON 32/64, TANDY, ORIC 1, RML 380Z & 480Z, SHARP, THE MSX RANGE and many others.

So now the leaders of the colour monitor pack give you a choice: CUB 452 or the revolutionary RGB/PAL – either way, you're on a winner.

– THE CUB STANDARD RESOLUTION COLOUR MONITOR

CUB 452 NOW AVAILABLE IN NEW PLASTIC CABINET AND 20" SCREEN VERSION

MICROVITEC cub 452
COLOUR DISPLAYS
MICROVITEC PLC, Futures Way, Bolling Road,
BRADFORD, BD4 7TU, West Yorkshire.
Tel: (0274) 390011 Telex 517717

Available from High Street Computer Retailers and branches of W. H. Smith, Harrods, John Lewis Partnership, John Menzies with selected models available from larger branches of Boots.

TAKE A TEST FROM THE RANGE

PEN DOWN
ON
CUMANA
THE MARK OF SAFETY
BS 415
CUMANA 0
CUMANA 1
CUMANA
DISK DRIVE GUIDE
CUMANA

So now you have got your home computer, you're ready to talk to Cumana – the best name in memory. Already a market leader throughout Europe for their range of disk drives, Cumana now have other products on offer, all to the same exacting standards that have made their disk drives the number one choice in the home and in education.

The Touch Pad

The Touch Pad is a low-cost graphic plotting aid for the BBC micro. This compact display cursor moving device simplifies programming with the touch of the stylus.

The product comes complete with an instruction booklet, basic software, stylus and connecting cable. Its uses are in graphics, computer aided design, education and games.

£69.95
including VAT.

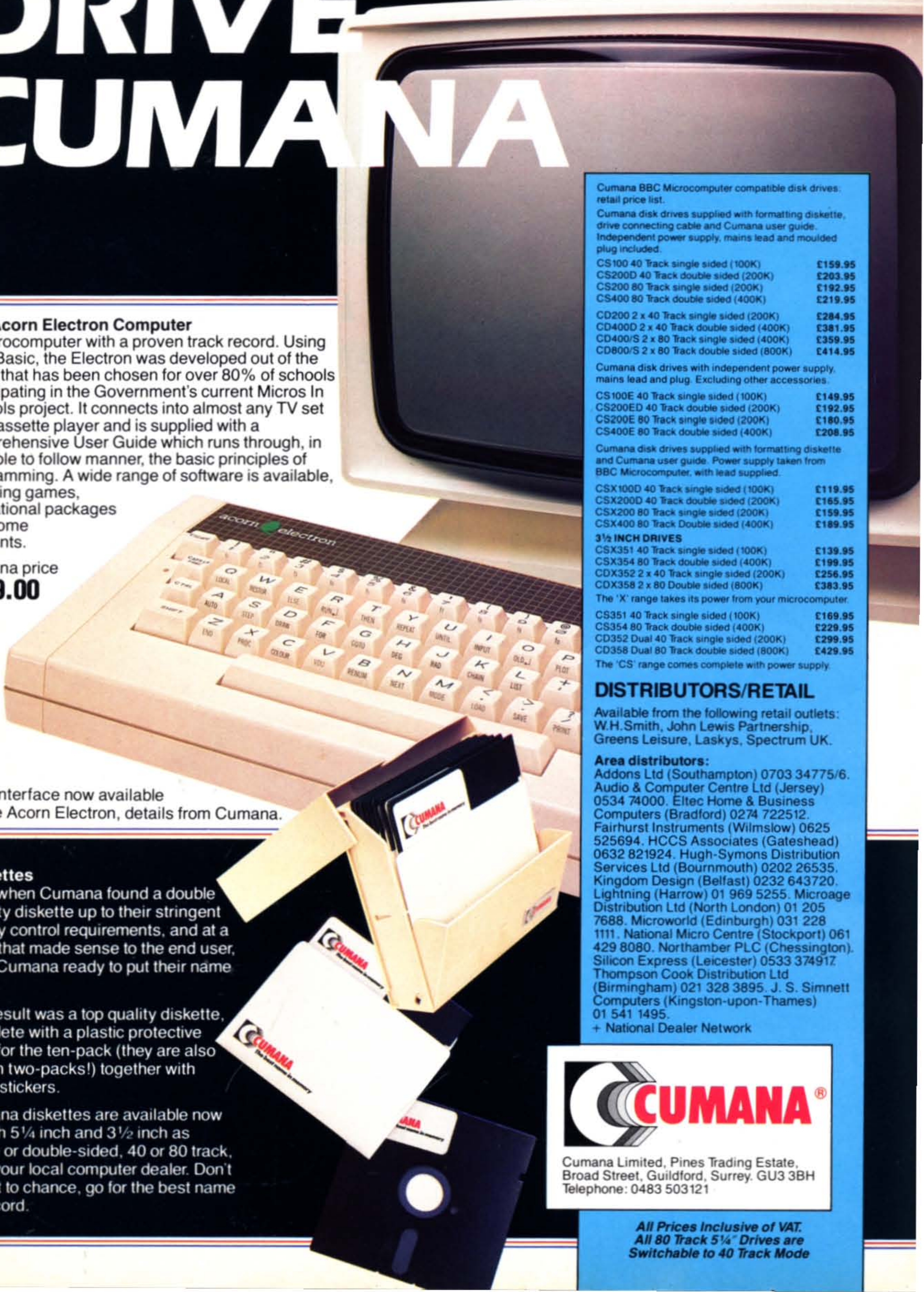
BE SAFE NOT SORRY

Cumana's CS range of single disk drives have been subjected to the strict safety demands of the BEAB.
They have now been awarded BS415 approval, so if you value safety do not trust it to anything less than Cumana.
Cumana's dual range of disk drives have also been submitted for approval.

Disk Drives

Cumana have spent years on research, development and marketing a range of drives second to none. Their drives are compatible with BBC, Spectrum, Dragon, Oric, Tandy Models III and 4 and Video Genie. They are fully guaranteed for 12 months and approved for electrical safety by the D.M.E.E. and are extensively used in GLC and ILEA establishments. Cumana were the first independent disk drive supplier and are now Europe's market leader. Their products have been proven in the schools, universities and homes throughout Europe. Let us drive you in the right direction, send now for further details of the Cumana range, or see them at our distributors and at selected branches of W.H. Smith, Lasky's, Greens, Currys, and Spectrum UK.

DRIVE CUMANA



The Acorn Electron Computer
A microcomputer with a proven track record. Using BBC Basic, the Electron was developed out of the Micro that has been chosen for over 80% of schools participating in the Government's current Micros In Schools project. It connects into almost any TV set and cassette player and is supplied with a comprehensive User Guide which runs through, in a simple to follow manner, the basic principles of programming. A wide range of software is available, including games, educational packages and home accounts.

Cumana price
£199.00

Disk interface now available for the Acorn Electron, details from Cumana.

Diskettes
Only when Cumana found a double density diskette up to their stringent quality control requirements, and at a price that made sense to the end user, were Cumana ready to put their name to it.

The result was a top quality diskette, complete with a plastic protective case for the ten-pack (they are also sold in two-packs!) together with index stickers.

Cumana diskettes are available now in both 5¼ inch and 3½ inch as single or double-sided, 40 or 80 track, from your local computer dealer. Don't trust it to chance, go for the best name on record.

Cumana BBC Microcomputer compatible disk drives: retail price list.

Cumana disk drives supplied with formatting diskette, drive connecting cable and Cumana user guide. Independent power supply, mains lead and moulded plug included.

CS100 40 Track single sided (100K)	£159.95
CS200D 40 Track double sided (200K)	£203.95
CS200 80 Track single sided (200K)	£192.95
CS400 80 Track double sided (400K)	£219.95
CD200 2 x 40 Track single sided (200K)	£284.95
CD400D 2 x 40 Track double sided (400K)	£381.95
CD400/S 2 x 80 Track single sided (400K)	£359.95
CD800/S 2 x 80 Track double sided (800K)	£414.95

Cumana disk drives with independent power supply, mains lead and plug. Excluding other accessories.

CS100E 40 Track single sided (100K)	£149.95
CS200ED 40 Track double sided (200K)	£192.95
CS200E 80 Track single sided (200K)	£180.95
CS400E 80 Track double sided (400K)	£208.95

Cumana disk drives supplied with formatting diskette and Cumana user guide. Power supply taken from BBC Microcomputer, with lead supplied.

CSX100D 40 Track single sided (100K)	£119.95
CSX200D 40 Track double sided (200K)	£165.95
CSX200 80 Track single sided (200K)	£159.95
CSX400 80 Track Double sided (400K)	£189.95

3½ INCH DRIVES

CSX351 40 Track single sided (100K)	£139.95
CSX354 80 Track double sided (400K)	£199.95
CDX352 2 x 40 Track single sided (200K)	£256.95
CDX358 2 x 80 Double sided (800K)	£383.95

The 'X' range takes its power from your microcomputer.

CS351 40 Track single sided (100K)	£169.95
CS354 80 Track double sided (400K)	£229.95
CD352 Dual 40 Track single sided (200K)	£299.95
CD358 Dual 80 Track double sided (800K)	£429.95

The 'CS' range comes complete with power supply.

DISTRIBUTORS/RETAIL

Available from the following retail outlets: W.H.Smith, John Lewis Partnership, Greens Leisure, Laskys, Spectrum UK.

Area distributors:
Addons Ltd (Southampton) 0703 34775/6. Audio & Computer Centre Ltd (Jersey) 0534 74000. Eltec Home & Business Computers (Bradford) 0274 722512. Fairhurst Instruments (Wilmslow) 0625 525694. HCCS Associates (Gateshead) 0632 821924. Hugh-Symons Distribution Services Ltd (Bournmouth) 0202 26535. Kingdom Design (Belfast) 0232 643720. Lightning (Harrow) 01 969 5255. Microage Distribution Ltd (North London) 01 205 7688. Microworld (Edinburgh) 031 228 1111. National Micro Centre (Stockport) 061 429 8080. Northamber PLC (Chessington). Silicon Express (Leicester) 0533 374917. Thompson Cook Distribution Ltd (Birmingham) 021 328 3895. J. S. Simnett Computers (Kingston-upon-Thames) 01 541 1495.
+ National Dealer Network

CUMANA®

Cumana Limited, Pines Trading Estate,
Broad Street, Guildford, Surrey. GU3 3BH
Telephone: 0483 503121

All Prices Inclusive of VAT.
All 80 Track 5¼" Drives are Switchable to 40 Track Mode

BET YOU £1 YOU CAN'T CRACK IT.

CASTLE QUEST
BY MICRO POWER

Can you meet the challenge of Castle Quest, the absorbing new game for the BBC Micro featuring Micro Power's revolutionary M.P.4 Scrollerama system? A game that's so difficult, we're prepared to bet you a pound, that even employing lightning reactions and sound logic you still can't crack it within three full months.

You can make a start at winning the wager by buying Castle Quest on cassette or disk from any of the dealers listed on the opposite page.

And good luck.
You'll need it.

Probably the most challenging game ever devised for the BBC Micro.

CASTLE QUEST
BY MICRO POWER

AVON

Avon Computer Rentals
Bristol. 0272 550600

Computa News
Bath. 0225 60541

BEDFORDSHIRE

Spectrum Electronics
Luton. 0582 34894

Software Centre
Bedford 0234 44733

Hobbyte Ltd.
Luton. 0582 457195

Chilton Computer Centre
Luton. 0582 455684

BERKSHIRE

Microstyle
Newbury. 0635 41929

BUCKINGHAMSHIRE

Reed Photo & Computer
Chesham. 0494 783373

Databench
Marlow. 0628 475411

CAMBRIDGESHIRE

G.C.C. Cambridge
Sawston. 0223 835330

Heffers Booksellers
Cambridge. 0223 358241

CHESHIRE

Marple Computer Centre
Stockport. 061 449 9933

Q.E.S. Computers
Cheadle. 061 428 6912

Control Technology
Hyde. 061 366 8223

Congleton Computer Services
Congleton. 02602 70635

Double Line Ltd.
Great Sankey. 0925 573212

Delta Micro Centre
Macclesfield. 0625 618827

CLEVELAND

Multicoloured Micro Shop
Redcar. 0642 486643

Uptons
Redcar. 0642 482521

Uptons
Middlesbrough. 0642 244291

Uptons
Stockton. 0642 679737

The Games Store
Middlesbrough. 0642 247553

Topsoft Computer Software
Stockton. 0642 670503

CORNWALL

Computavision
St. Austell. 0726 75297

Penzance Micro Centre
Penzance. 0736 66336

Microtest
Bodmin. 0208 3171

COUNTY DURHAM

Darlington Computer Centre
Darlington. 0325 487478

CUMBRIA

Barrow Computer Shop
Barrow in Furness. 0229 38353

Kendal Computer Centre
Kendal. 0539 22559

DERBYSHIRE

First Byte Computers
Derby 0332 365280

The Computer Centre
Chesterfield. 0246 208802

DEVON

Computabase
Plymouth. 0752 672128

Computer Systems
Paignton. 080352 4284

Open Channel
Exeter. 0392 218187

Georges Booksellers
Exeter. 0392 71072

Georges Booksellers
Plymouth. 0752 661011

Sinewave Computer Services
Taunton. 0823 57526

DORSET

Landsdown Computer Centre
Poole. 0202 670901

Solent Micro Systems
Christchurch. 0202 470468

Seven Counties
Dorchester. 0305 66022

EIRE

Computer People
Swords. 0001 404700

DMA Computers
Dublin. 0001 761660

Lendac Data Systems
Dublin. 0001 710226

Chip Electronics Services
Cork. 010 353 21 502428

ESSEX

Brainwave Micros
Colchester. 0206 561513

Brainwave Micros
Romford. 0708 41719

H Reynolds & Sons
Grays. 0375 31641

Colchester Computer Centre
Colchester. 0206 47242

Computer at Home
Harwich. 0255 507122

Clarke Coysten Computers
Southend. 0702 337161

Anglia Personal Computers
Braintree. 0376 20874

HAMPSHIRE

Esdevium
Aldershot. 0252 311443

Unit 1 Services
Purbrook. 0705 267853

Baytree Bookshop
Waterlooville. 0705 263084

Electronequip
Fareham. 0329 230671

HERTFORDSHIRE

Compshop Limited
New Barnet. 01 441 2922

County Computers (Hitchin) Ltd.
Hitchin. 0462 36757

March Software
Sawbridgeworth. 0279 24341

HUMBERSIDE

Hard Soft and Floppy
Hull. 0482 52143

The Computer Centre
Hull. 0482 24346

S O Software
Grimsby. 0472 751444

Tomorrows World
Hull. 0482 24887

Tomorrows Technology
Scunthorpe. 0724 871756

Brigg Computer Centre
Brigg. 0652 53364

Beverley Computer Centre
Beverley. 0482 881911

ISLE OF MAN

T. H. Colebourn Ltd.
Douglas. 0624 73482

ISLE OF WIGHT

Vectis Management
Newport. 0983 525450

KENT

Kent Computer Centre
Chatham. 0634 826080

Microway Computers
Rainham. 0634 376702

Canterbury Software Centre
Canterbury. 0227 453531

Canterbury Computer Centre
Canterbury. 0227 462101

Video Vision
Broadstairs. 0843 63284

LANCASHIRE

Castle Computers
Lancaster. 0524 61133

Computer Shop
Lancaster. 0524 66966

The Computer Shop
Morecambe. 0524 411044

Home & Business
Oldham. 061 626 3841

Cannings
Leigh. 0942 672590

Computer World
Bolton. 0204 494304

Blackpool Computer Stores
Blackpool. 0253 27091

Micro North
Bury. 061 797 5764

PV Tubes (Computers)
Accrington. 0254 36521

Sweetens
Preston. 0772 52494

Central Studios
Southport 0704 31881

IMO Computers
Burnley. 0282 54299

Computatill
Oldham. 061 6336 965

Micro Code
Clitheroe. 0200 27890

4 Mat Computing
Preston. 0772 561952

LEICESTERSHIRE

R & B Computer Software
Hinckley. 0455 611133

Leigh Computer Systems
Hinckley. 0455 612139

Micro-Mays
Leicester. 0533 22212

LINCOLNSHIRE

Felix Computers
Boston. 0205 54321

LONDON

Logic Sales
London. 01 882 4942

Vic Oddens
London. 01 403 1988

Lion House Software
London. 01 580 7383

Virgin Games Centre
London. 01 961 2919

G & B (Computers) Electronics
London. 01 580 3702

Castlehurst Ltd.
Wetstone. 01 446 2280

Castlehurst Ltd.
Peckham. 01 639 2205

Buffer Microshop
Streatham. 01 769 2887

MANCHESTER

NSC Computer Shops
Manchester 061 832 2269

Saddler Computer Services
Ashton in Makerfield. 0942 719122

Mighty Micro
Fallowfield. 061 224 8117

Leigh Computers
Sale. 061 905 2144

MERSEYSIDE

Microman
St. Helens. 074488 5242

Thorn Guard
The Wirral. 051 3427516

MIDDLESEX

Youngs Newsagency
Hayes. 01 573 5119

Twickenham Computer Centre
Twickenham. 01 891 4991

Trionic
Harrow. 01 861 0036

Twillstar Computers
Southall. 01 574 5271

MIDLANDS

Impulse Computer World
Coventry. 0203 27711

Micro Centre
Cotteridge. 021 458 4564

NORFOLK

Brainwave Micros
Norwich. 0603 663796

Thetford Micros
Thetford. 0842 61645

NORTHERN IRELAND

Oltrosoft
Carryduff. 0232 812014

Everyman Computer Services
Ballamoney. 02656 62116

M & W Software
Belfast. 0232 650714

F C Computers
Lurgan. 07622 28543

NORTHUMBERLAND

Alnwick Computerware
Alnwick. 0665 604816

Newstand
Ashington. 0670 812194

NOTTINGHAMSHIRE

Mansfield Computers
Mansfield. 0623 31202

G.A. Computers Ltd.
Ruddington. 0602 211225

S P Electronics
Hucknall. 0602 640377

SCOTLAND

James G Bissett
Aberdeen. 0224 644528

Microstore
Stirling. 0786 64571

Cursor Computers
Irvine. 0294 212014

West Coast Personal Computers
Ayr. 0292 285082

Microshack
Aberdeen. 0224 636081

James Thin & Sons
Edinburgh. 031 556 6743

Video Giants
Inverness. 0463 241853.

Silicon Centre
Edinburgh. 031 557 4546

Tomorrows World
Erwick, Shetland. 0595 214

SHROPSHIRE

Telford Electronics
Telford. 0952 504911

STAFFORDSHIRE

Kirklands Microwave
Stoke on Trent. 0782 415787

Town Computer Store
Hanley. 0782 287540

SUFFOLK

Brainwave Micro
Ipswich. 0473 50965

Micro Management
Ipswich. 0473 59181

SURREY

Computerama
Banstead. 07373 54717

Micro Workshop
Epsom. 037 27 21533

3D Computers
South Tolworth. 01 337 4317

3D Computers
Sutton. 01 642 2534

Computersolve
Surbiton. 01 390 5135

SUSSEX

Bits and Bytes
Bognor Regis. 0243 867143

Michael Business Centre
Burgess Hill. 0444 645636

Orchard Business Centre
Horsham. 0403 64884

C J E Micro Computers
Worthing. 0903 213900

The Gamer
Brighton. 0273 728681

TYNE AND WEAR

The Comp-u-Shop
Newcastle upon Tyne.
0632 618673

The Computer Shop
Newcastle. 0632 616260

Computer Cabin
Silverdale. 0782 636911

WALES

VMS Computer Centre
Newport. 0983 525450

Alpha Business Centre
Colwyn Bay. 0492 31813

Edmunds Toy & Games
Newport. 0633 51441

Computer System Consultants
Ystrad Mynach. 0443 816188

Computer Centre
Haverfordwest. 0437 2776

Morris Educational Assoc.
Newtown. 0686 25261

Cardiff Micros
Cardiff. 0222 373072

Gwynedd Computers
Caernarfon. 0286 2610

Cambrian Software Works
Blanau Ffestiniog. 0766 831878

Bucon
Swansea. 0792 467980

Citi Soft
Cardiff. 0222 488118

Gwent Computers
Newport. 0633 841760

Computability
Ebbw Vale. 0495 301651

Merthyr Micros
Merthyr Tydfil. 0685 82230

C N S Newshop
Cardiff. 0222 383867

The Paper Mill
Rhiwbina. 0222 628491

Leisuretime
Bridgend. 0656 67444

Teleview
Neath. 0639 53282

WARWICKSHIRE

Leamington Hobby Centre
Leamington Spa. 0926 29211

WILTSHIRE

Carvells of Rugby Ltd.
Rugby. 0788 65275

Minstrel Limited
Marlborough. 0672 55139

Brittox News
Devizes. 0380 5757

WORCESTERSHIRE

Micro Centre
Evesham. 0386 49641

YORKSHIRE

Arthur Yates
Ripon. 0765 2737

Micro Power
Leeds. 0532 458800

Breakers Yard
Keighley. 0535 67206

Computing World
Scarborough. 0723 352381

Danum Computer Supplies
Doncaster. 0302 20355

The Computer Room
Barnsley. 0226 204000

Electro Empire
Bradford. 0274 662476

G.T.M. Computers
Leeds. 0532 647474

Halifax Computer Centre
Halifax. 0422 61797

Home Computers
North Allerton. 0462 36757

H.V.L Computers
Sheffield. 0742 661328

Micro Bridge
York. 0904 39449

Tapp & Toothill
Leeds. 0532 435491

Resource Facilities
Halifax. 0422 69955

Look and See
Skipton. 0756 60078

Ossett Ind. Co-op
Ossett. 0924 273611

Computatill
Huddersfield. 0484 25401

Chris Townsend
Huddersfield. 0484 516266

Amrik Electronics
Bradford. 0274 722530

CASTLE QUEST

BY MICROPOWER

FOR MORE AREA DEALERS SEE PAGE 49

AMX ART

AMX MOUSE

The AMX MOUSE is an advanced opto-mechanical device which brings to the B.B.C. micro facilities hitherto only available on more expensive machines. It enables you to use advanced features such as ICONS, WINDOWS, and POINTERS in your own programs.

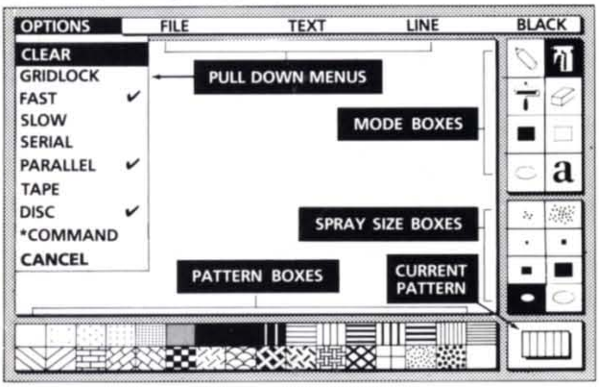
The AMX MOUSE can be used with ordinary programs to replace the cursor keys and with the AMX software it turns the B.B.C. micro into a far more user-friendly device, enabling beginners to quickly learn to use the computer for a wide range of purposes, including COMPUTER AIDED DESIGN, Word Processing, and a host of business uses – to say nothing of its inclusion in games software.

A further range of software will be released in 1985. Starting with "DESK TOP MANAGER".

THE AMX MOUSE PACKAGE

The AMX MOUSE – an advanced three buttoned mouse which simply plugs into the B.B.C. user port drawing its power from the computer.

AMX ART GRAPHICS PROGRAM



The AMX ROM – contains fast machine code routines for creating on screen windows, icons, and pointers and enables the MOUSE button to be programmed for use with commerial software such as Wordwise and VIEW.

Please send No.________ **AMX MOUSE** package/s (including **AMX ART** and EPROM) at **£89.95** inc. VAT and P&P.
I enclose a cheque/PO for £__________or debit my credit card.

Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ ☐ Visa ☐ Access

Name ____________________

Address ____________________

____

Signature________________ **Date**________

(Please tick choice of media for AMX ART) ☐ Cassette ☐ 3″ Disc ☐ 5¼″ Disc

To: Advanced Memory Systems Ltd., Woodside Technology Centre, Green Lane, Appleton, Warrington, WA4 5NG, England.
MU3/85

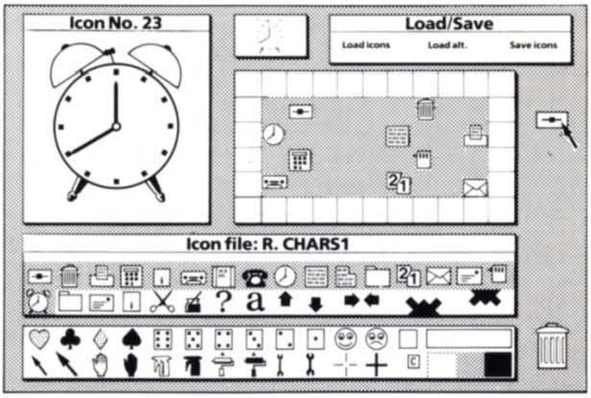
If not available from one of our main dealers, fill in the coupon and we will send you an AMX MOUSE with AMX ART with our full no quibble money back guarantee. OR phone 0925 602690/62907 for instant Access or Visa orders.

A MANUAL describing how to operate the MOUSE and the ROM routines which are available in both basic and machine code programs.

AMX ART – a superb computer aided drawing program on both tape cassette and a 5¼″ floppy disc with its own manual. It is suitable for a wide range of uses including preparation of illustrations, architectural and engineering detail drawings, teachers' worksheets, and just creating your own pictures. It soon becomes addictive.

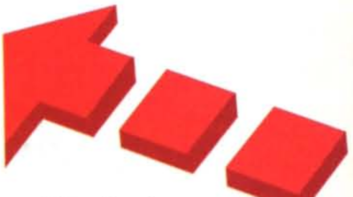
AMX ART includes full use of on screen menu boxes, icons, and pull down menus so that beginners find it very easy to learn and gain confidence in the use of the B.B.C. Micro.

An ICON DESIGNER program which enables you to create and store icons for use in your own programs.



ICON DESIGN PROGRAM

TECHNICAL REQUIREMENTS

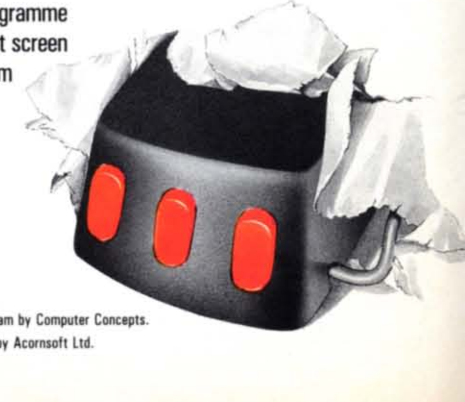


The AMX MOUSE can be used with any B.B.C. Model B computer fitted with the Operation System 1.2 and is compatible with the second processor and disc or tape filing systems.

The AMX MOUSE is adjustable for sensitivity via software control and three buttons can be programmed to simulate 24 different key codes.

The AMX MOUSE may be disabled by a simple software command and will then not interfere with normal operation of the computer.

The AMX ART programme enables users to print out screen displays using any Epsom compatible dot-matrix printer. Owners of non-standard printers may use their own screen dump routines.

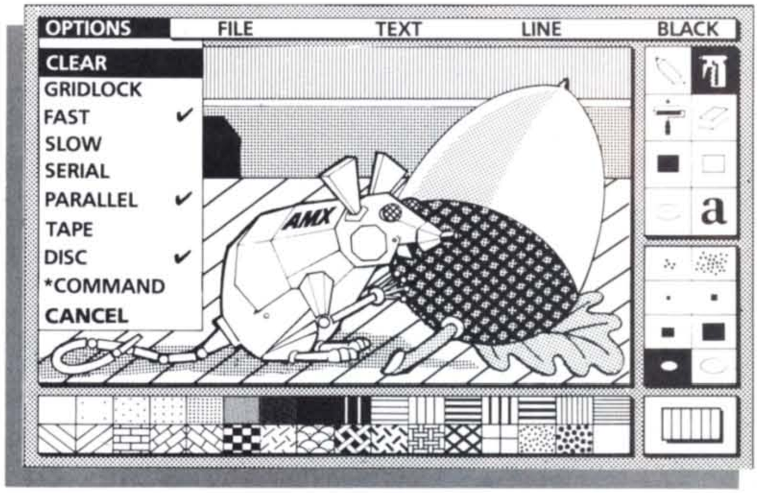


'Wordwise' is a wordprocessing program by Computer Concepts.
'View' is a word processing program by Acornsoft Ltd.

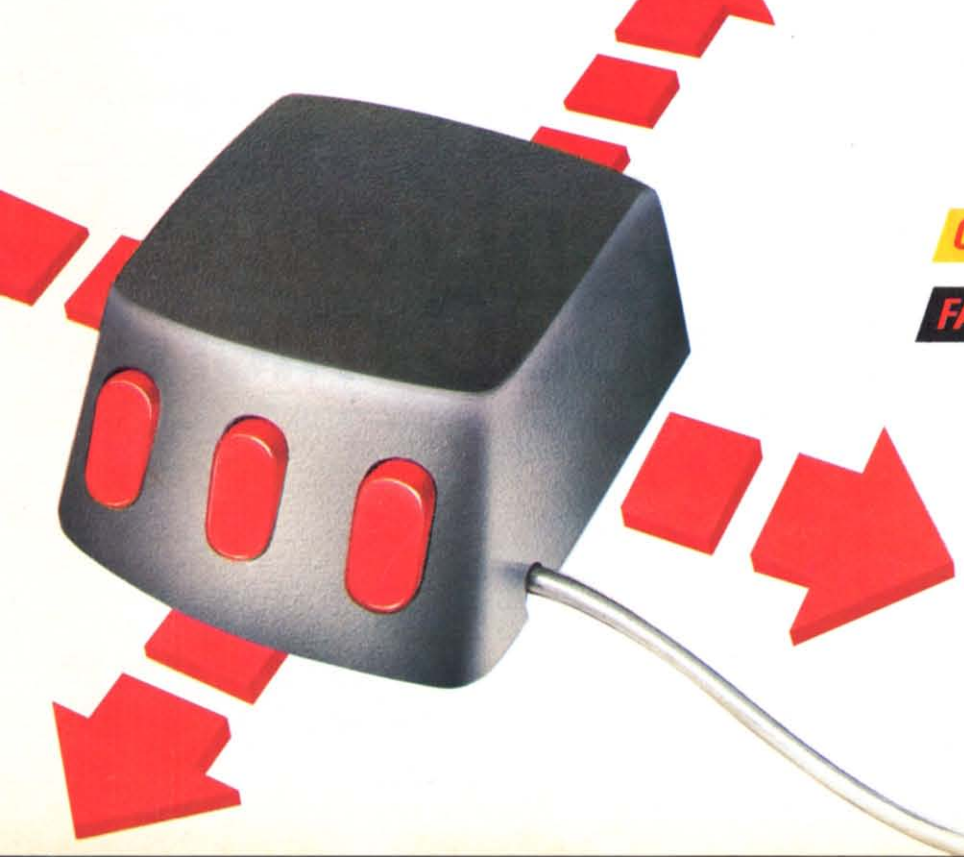
AMX MOUSE

POINTS THE WAY

FOR THE BBC MICRO MODEL B


OPTIONS
FILE
TEXT
LINE
BLACK
CLEAR
GRIDLOCK
FAST ✓
SLOW
SERIAL
PARALLEL ✓
TAPE
DISC ✓
*COMMAND
CANCEL
AMX
a

with AMX ART GRAPHICS PROGRAM



ICON SOFTWARE

CREATIVE GRAPHICS

FASTER INTERACTION

This state of the art range of 3″ CRESCENT units with Japanese mechanisms are

THE MICRO COST £129.95 3″ DISK DRIVES

manufactured by Servicon Dynamics, a company with over 15 consecutive years of specialist electronic manufacturing experience.

All items carry a 12 month warranty.

- Completely compatible with 5.25″ drives
- Full software support (plus INNER CIRCLE CLUB*)
- Full disk interface system for BBC
- No power supply needed
- Exclusive low cost accessories through INNER CIRCLE CLUB*
- One-touch disk load/unload
- Compact and lightweight

*See address below for details.

New Crescent range upgrade for BBC micro.

Type	Dual Unit (2 Drives)	Capacity with Crescent DFS	Capacity with Acorn DFS	Power Supply	Full Manual	Cables inc. in Price	Price**	Qty	£
CRESCENT 401	–	400K	200K	–	✓	✓	£129.95		
CRESCENT 402*	–	400K	200K	–	✓	✓	£199.00		
CRESCENT 421 (HorV)	✓	800K	400K	–	✓	✓	£259.90		
CRESCENT 422* (HorV)	✓	800K	400K	–	✓	✓	£398.00		
SPECIAL CRESCENT PACK A		Includes 401 + CRESCENT DFS					£249.95		
SPECIAL CRESCENT PACK B		Includes 421 + CRESCENT DFS					£379.90		
								TOTAL	
								15% VAT	
								Delivery	£6.00
								Total Due	

V = Stacked Dual Unit.

H = Low Profile side-by-side Dual Unit.

* Dual Head. ** Price excludes VAT and delivery.

Only one CRESCENT DFS per order.

Please allow 28 days for delivery.

Servicon Dynamics Limited,
Brook Street, Mitcheldean, Gloucestershire GL17 0SL
Tel: 0594 542021. Telex: 43586 SERDYN G

I enclose cheque for £.................... or debit my credit card.

☐ ☐ ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Name/Address ____________________

____

____

Signature ____________________

CRESCENT

THE MICRO USER

NEWS

MARCH 1985

TRADE – IN OFFER FOR A NEW BBC

NEW BBC Micros for old . . .

Acorn has launched a scheme under which any make or model of micro can be traded in for £50 against the purchase of a new BBC Micro.

"This applies to any machine whether it be an ancient ZX80 or an IBM PC", said an official Acorn spokesman.

All machines taken in part exchange will be subsequently shipped by dealers to Acorn headquarters.

Curry raps Sunday Times

CHRIS Curry, managing director of Acorn, has hit back at "inaccurate and uninformed" reports about the company in the national press.

He called a clear-the-air meeting in London to face Acorn's detractors and put the record straight.

This is what he told the media representatives:

“During the last few weeks there has been what seems like an orchestrated campaign in some sections of the press to run down the British computer industry in general and Acorn computers in particular.

In an inaccurate and uninformed article in the Sunday Times, the campaign began to resemble a vendetta.

It is a curious and perverse trait of the British to build something up and then immediately attempt to knock it down; to minimise our own successes while magnifying our competitors' achievements.

Delivering these self-inflicted wounds can have no other result than to give our foreign competitors an advantage, which is particularly self-defeating in this instance since the British computer industry has been – and

Turn to Page 24

NEW ACORN DRIVE ON EDUCATIONAL FRONT

ACORN has launched the second wave of its attack on the UK educational front.

Having established a sizeable beachhead – the BBC Micro is already used in 74 per cent of all schools and colleges and has 83 per cent of total sales to primary schools – the company has now unveiled a plan to achieve even greater market penetration.

Known as the "Micros in Schools Scheme", it will seek to take up where the Department of Trade and Industry's 50 per cent grant subsidies projects left off.

The new initiative will be spearheaded by "substantial discounts" not only to schools but also for the first time to colleges and places of higher education.

Packages

Special purchase packages are to be offered with savings of hundreds of pounds off current recommended prices.

"We believe these terms will appeal to many financially hard-pressed schools and increase the number of children and students able to take part in the new technology", says Chris Curry, Acorn's managing director.

The new scheme is also designed to radically improve the level of support and help for educational computer users.

A Suppliers' Forum is to be set up where educationalists can present their needs to the industry as a whole in order to allow schools to make best use of their resources.

Acorn is also to launch an Education Hotline so authorities and colleges can talk to company experts for help with problems.

"There is no way in which we can lose our number one position in the education market", an Acorn spokesman told *The Micro User*.

"But what we are setting out to do with this new scheme is to broaden our already substantial user base".

Enhanced model on way?

FIRST official hint that an enhanced version of the BBC Micro is on the drawing board has come from Acorn MD Chris Curry.

But he refused to say when it will be launched. Nor would he reveal any of its specifications.

However he did say that it would be fully compatible with the BBC Model B – which means it will be able to run all the software now being produced for the BBC Micro.

Said Curry: "It is absolutely vital that the present BBC Micro is not made redundant by future models".

He also said that Acorn were currently renegotiating the amount of royalty Acorn pay to the BBC for every micro sold. At present it stands at £10 a machine.

Income

This means that the 100,000 pre-Christmas sales of BBC Micros netted the BBC itself a handsome £1 million – and the total sales of the machine in the whole of 1984 produced nearly two and a half million pounds in unearned income for the Corporation.

Despite considerable speculation in the industry, no-one at the Acorn Offices in Cambridge or London would give any details about the new model or say when it would be launched.

Nightingale has something to sing about

A MICRO company has topped a new UK sales chart – with more than a little help from the BBC Micro users and some shady characters known as hackers.

Pace Software, of Bradford, has learned that its Nightingale modem outsold all its rivals during December.

It beat off the competition to be named No 1 in a new Top Ten list compiled by Micronet 800, the leading information provider on Prestel.

"This is in the main due to the modem's popularity with BBC Micro users who make up 70 per cent of our subscribers", said a Micronet spokesman.

But Pace is also known to have received support from a most unusual quarter in achieving its success.

For the Nightingale is the first choice of hackers, the new breed of computer whizz kids who have developed the ability to electronically break into sophisticated computer systems where sensitive data is stored.

It was a Pace Nightingale which was used when a leading UK hacker cracked a key American defence system computer in a spectacular demonstration to open the Electron & BBC Micro User show in London last December.

"Naturally we are aware that the Nightingale is the main weapon in the hacker's armoury", admits David Hood, of Pace.

"But that only shows what discriminating types they are. After all, there is no more powerful modem on the market".

The Top Ten modem sales list for December:

1. *Pace Nightingale*
2. *Prism VTX 5000*
3. *Prism Modem 1000*
4. *CBM 64 Communications Cartridge*
5. *Acorn Prestel Adapter*
6. *Telemod 2, OEL*
7. *WS2000, Miracle Technology*
8. *Wren Computers Modem*
9. *Prism Modem 2000*
10. *Tandata TM 200*

BBC Micros are used to edit Mimac

Maritime service uses BBC Micros

THE world's most sophisticated electronic information service for shipping has been started in Liverpool – and the BBC Micro has a key role in its operation.

Liverpool Polytechnic, backed by the Department of Trade and Industry, has established a viewdatabase centre offering ships an unprecedented communication facility.

The Marine Information Management Centre – Mimac – project allows ships in all parts of the world to contact the Polytechnic via satellite for a wide range of shipping and general information.

Aim is to establish a database capable of handling the full spectrum of information and communication requirements of merchant ships and offshore structures like oil rigs.

It will also act as a testbed data communication facility for shipping, ultimately developing into a commercial service.

The project has caused excitement in the shipping world, with most of the major UK shipping companies showing interest.

P & O Line's prestigious new cruise liner Royal Princess is being fitted with equipment allowing it to use the Mimac project.

Passenger cabins will have colour TVs carrying a teletext channel fed by Mimac providing features similar to Ceefax and Oracle.

Ships' officers will have access to a complete range of data, including such areas as navigation and port information.

Acorn Computers is sponsoring installation of equipment allowing the QE2 to use Mimac.

P & O's Sea Princess, a luxury private yacht, and a major oil company are also taking part.

Operation Raleigh, the international youth venture, is a major user both aboard the vessel "Sir Walter Raleigh" and at its command centres ashore.

Mimac is accessed via Inmarsat, the marine satellite link, VHF or public telephone.

Vessels with satellite communication terminals need only the appropriate micro to use the system.

It provides its own terminal program based on the BBC Micro, Torch and IBM PC.

The program allows maximum preparation of data before going online, instant storage while online, and easy file handling and printing of data received.

Mimac is edited using BBC Micros running PrEDITor, a sophisticated editing program developed by Mimac project team members.

Paper rapped

From Page 23

continues to be – one of the great British success stories of today.

I want to correct some of the inaccurate stories that are circulating about Acorn and its products, and to set the record straight about our Christmas sales which, contrary to reports, were at an all-time high.

The Sunday Times has said Christmas 1984 brought fewer computer sales than the previous Christmas. Where did they dream that one up?

They also said Acorn had had a "disastrous Christmas". And they quoted a researcher as saying the BBC Micro "was sinking into oblivion".

The researcher denies saying this. Nor have we found anyone who believes it. That's not surprising – look at the facts:

- In 1984 we sold 420,000 computers – more than double the number in 1983.
- BBC Micro sales totalled 230,000 units – more than in any previous year – and Electron sales were 190,000.
- Over Christmas alone we sold more than 100,000 BBC Micros and a further 100,000 Electrons – an impressive sales volume in my view, and double the volume of Christmas 1983.
- We estimate our share of the home computer market to be around 25 per cent, an increase of over 10 per cent in just 12 months. We now have an installed base of over 700,000 units.

Considering that our products are at the top end of the market, I would call this a major achievement – hardly a sign of imminent oblivion! ”

STUDYING MICROS IN ACTION

THOUSANDS of nine to 13-year-olds all over the country are learning how their school BBC Micro can be used to solve practical problems.

Granada Television's "The Micro at Work", which began in January and ends this month, is a series of ten 15 minute programmes illustrating the exciting uses of computers in the world today.

The series shows how micros are used rather than how they work or how they are programmed, and the broadcasts take the form of televised "school trips" to locations where computers are in action. These include the Heathrow Airport traffic control tower, a German computer-controlled railway marshalling yard, a busy police headquarters, a travel agency and a factory.

Using special software produced by Granada, pupils can tackle scaled down versions of featured applications in the classroom.

Challenge from the champion

JUDO expert and TV Superstars champion Brian Jacks has challenged BBC Micro users to eight testing events – arm-dips, squat thrusts, canoeing, cycling, football, swimming, archery and the 100 metres.

Brian, who holds the world record for arm-dips of 54 in 30 seconds, is appearing regularly on BBC's "Micro Live" and the new software release "Superstar Challenge" from Martech will be featured on the programme on March 8 and 9.

The game requires a strategic approach as well as quick reactions and costs £7.95.

TAPE TO DISC TRANSFER – PLUS PROTECTION

A NEW ROM based system for the BBC Micro that enables tape programs to be transferred to disc has been announced by Vine Micros.

It allows all available RAM – &400 to &7FFF – to be used by the computer.

Cassette based software is saved onto disc via the ROM complete with protection, and when required for use is loaded back through the ROM.

The system, called the TD ROM, provides transfer of programs from tape to disc, does not break program protection and cannot be used to copy programs.

The ROMs will be programmed in groups that will vary slightly from batch to batch and be randomised on despatch.

Each transferred program will therefore be as individual as is practical to the TD ROM that saved it, and it is unlikely programs will interchange easily between users of the ROM. Price: £18.

Try, then buy!

A NEW way of distributing software has been introduced which lets users try the product and then send in however much they feel it is worth.

Behind the idea is Jack Gibbons, an electronic data processing security officer in London for the Dutch ABN Bank. He has devised a "Personal Banking System" for the BBC Micro.

His company – Hilton Computer Services – sends out the cassette-based program on payment of postage and packing. After customers try it out, they send him a donation, based on how much they think the software is worth.

Despite a few setbacks – one recent customer sent only 60 pence – Gibbons is sure his "freeware" idea will take off.

Security on ROM

COMPLETE protection from unauthorised use of your micro is promised by Elm Systems with its new security ROM.

You choose your own password, which is unique to your system and can be changed at any time. If successive invalid passwords are input a loud alarm sounds and the keyboard is locked out.

The security ROM also includes a management system for other ROMs fitted to the system, a real-time clock, datestamp facility and Basic help.

Price is £16.

BBC Micro
The ARCOM

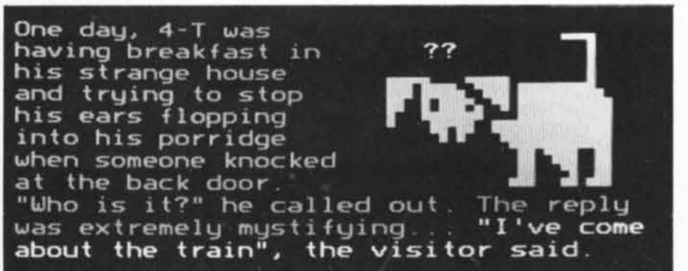
Link to STE bus systems

THE Beebop interface from Arcom Control Systems links STE bus systems to BBC Micros, providing real world I/O potential for the computer and an advanced colour graphics facility for the STE bus.

BBC Micros gain access to STE's sophisticated data acquisition and control orientated features such as its 1mbyte addressing range and 4k of I/O space. And STE systems gain a means of developing Basic programs, with the benefit of the BBC's colour graphics output, to 640 × 256 points with two colours or 160 × 256 points resolution with 16 colours.

The interface is a standard single Eurocard which sits in an STE card frame, connecting to the micro's 1mHz bus via a 34 way ribbon cable which plugs into any socket on the bus extender.

A filing system eprom also supplied adds a set of STE-orientated commands to the Basic interpreter, providing it with dedicated facilities for A/D conversion, reading or writing to memory or I/O locations and performing block moves.



One day, 4-T was
having breakfast in
his strange house
and trying to stop
his ears flopping
into his porridge
when someone knocked
at the back door.
"Who is it?" he called out. The reply
was extremely mystifying... "I've come
about the train", the visitor said.

And when
4-T opened the
door, he was
even more
puzzled. The
visitor was
a very strange
creature indeed!

Cartoon on disc

CHANNEL 4 teletext service 4-Tel has gone into the software business with an offer to BBC Micro owners of a cartoon story on disc.

The story is an adventure involving the dog hero of 4-Tel's popular children's feature "The Fantastic Adventures of 4-T".

The 12 episodes are contained on disc with an introductory animated sequence. The reader is invited to turn the pages or ask 4-T to turn them at a selected interval.

"The concept is very simple", says 4-Tel's managing editor Mort Smith. "A story book is brought into the electronic age with glowing colour and animated sequences.

Example

"We believe it is the first time a teletext feature has been offered in this way, and is a good example of Mode 7 graphics on the BBC Micro".

Other 4-T adventures, from 4-Tel page 457, may be made available in the same way at a later date. The disc costs £9.99.

£60 WILL ORGANISE YOUR SYSTEM BEAUTIFULLY.

If you have a micro system which is beginning to roam all over the room, Opus can help you to get organised.

For only £59.95 you'll find our purpose built, beautiful teak finished Organiser Desk has plenty of storage space for a complete micro system.

The top shelf has sufficient room for both monitor and printer, while the large desk top area will accommodate your computer, disc drive or cassette recorder and software.

It has castors, making it fully mobile. And the assembled dimensions are H: 31" W: 40¼" D: 26"

Our price includes VAT and free delivery. And the desk comes with simple assembly instructions.

To order your system phone us on 01-701 8668 or post the coupon to: Opus Supplies Ltd., 158 Camberwell Road, London SE5 0EE.
Opening Hours: 9.00 – 5.30pm Monday – Friday.
9.00 – 1.00pm Saturdays.

ALSO AVAILABLE AT OPUS DEALERS NATIONWIDE.

To: Opus Supplies Ltd., 158 Camberwell Road,
London SE5 0EE.
Please rush me the following:
(PRICES INCLUDE VAT AND CARRIAGE.)

_____ Organiser Desk(s) at £59.95 each (inc VAT)
I enclose a cheque for £ _____ or please debit my credit card account with the amount of £ _____
My Access/Barclaycard (please tick) no. is:

____

Name _______________
Address _______________
____
____
____
Telephone _______________

Opus.
Opus Supplies Ltd.

BU 9

Acorn on Export IT Council

ACORN Computers has landed a major role in the organisation promoting the export of British information technology products.

The company has been elected to the Council of the British Information Technology Export Organisation – Export IT – which is planning an all out attack on world markets worth £100 billion.

Also on the council are the National Computing Centre, the Computing Services Association, the IT division of the Department of Trade and Industry, six leading trade associations and a number of other firms producing computers and related products.

Following the first meeting of the new council Export IT's chairman, Fraser Mitchell, said: "It is only by working together in this way that we can reverse the rapid increase in our trade deficit, now approaching £100 million a year".

Micro's sound advice

A SOLUTION to the problem of making difficult acoustic measurements in unfavourable test conditions has been devised by Grafitek Electronics using a BBC Micro-based system.

In conjunction with a Grafitek recorder, the FT-2000 ROM based software enables the user to perform a wide range of tests that would normally require expensive facilities such as anechoic echo-free chambers.

A combination of FT-2000, time window spectrometry and signal averaging techniques is claimed to offer the answer to many problems.

BBC brings success to the far-sighted optician

A BUSINESS that started in a bedroom and grew to become one of the country's leading suppliers to BBC Micro owners has reached another milestone.

Watford Electronics has moved into new, purpose-built £700,000 premises that reflect its current multi-million pound annual turnover.

Twelve years ago the firm consisted of a few items of stock in a corner of the bedroom of Nazir Jessa, then an optician and part-time dealer in electrical components.

For two years Nazir continued testing eyesight and prescribing glasses, building his mail order business at night and weekends with the help of his younger brother Raza.

The brothers rarely got to bed before the small hours, and weekends brought an additional workload – personal callers.

They advertised "Mail order only", but still the people came.

They tried "Callers on Saturday only", but that only created even longer queues that stretched from Nazir's lounge to the front gate and beyond.

In the third year of business he bought the shop and lock-up garage next door thinking they would provide enough space for 10 year's trading growth.

Within a year the premises were overflowing – and the floor-to-ceiling situation was only relieved by the new move to Watford's High Street.

There the firm's 30 staff are getting used to having some elbow room and the more than 7,000 different components and micro peripherals are accommodated with ease . . . at least for the time being.

Nazir's recipe for success: "First we advertised in the right magazines – like *The Micro User* – and we've always believed in advertising heavily all year round.

"Secondly, we stocked a big range. If people can buy everything under one roof they don't bother to go three doors away to save a few pennies on one item.

"But hard work is the key to everything", adds Nazir who, together with Raza, can still be found behind the counter serving the personal shoppers who still account for one third of the firm's business.

Watford Electronics

Watford Electronics' new home . . . and below, where it all started

WATFORD ELECTRONICS

tford Electronics
JESSA HOUSE

Nazir (left) and Raza Jezza

Co-op is holding BBC conference

THE Co-op is inviting BBC Micro owners to attend a computer conference weekend at its education department headquarters at Stanford Hall near Loughborough from March 8 to 10.

The conference has been arranged for co-op and other computer clubs, but individual micro enthusiasts are welcome to attend.

The event is grant-aided so the total cost for all the sessions, including meals and accommodation, is only £25.

Members of co-op computer clubs and retail societies may qualify for individual grants from their local co-op.

Representatives from companies and associations will present talks and demonstrations illustrating the latest computer techniques and equipment.

It is hoped the conference will result in the formation of a federation of co-operative computer clubs.

Specially for doctors

RELEASE of the Torch 20mbyte hard disc option has extended the Hungerford Medical Computing suite of management programs for general practice to a 25,000 patient database with up to 15 doctors.

Apart from organising the main database of patient records the suite also looks after repeat prescriptions and recall letters produced on the HMC Mediview word-processor.

Cost of the new system, marketed by M-Tec Computer Services, is £4,552. A basic system, incorporating Torch twin floppy discs and BBC Micro for up to 15,000 patients and seven doctors costs £2,700.

... and surgery staff

A SUITE of programs designed to save time and expense for doctors and surgery staff is being marketed by The Computer Room.

Micromedic comprises five modules – age/sex register, repeat prescriptions register, cytology register, immunisations register and disease reports.

The system will produce repeat prescriptions, alert and notify patients for recall, calculate due dates for immunisations and cervical smears and allow the receptionist to set up attendance timetables and send appointment times to patients.

The menu driven screen design guides the user through each stage of the operation, reducing the time needed for training.

The software costs £800 and the complete package with BBC Micro, disc interface, twin disc drives, View word-processing ROM, printer and green screen monitor costs £2,300.

BET YOU £1 YOU CAN'T CRACK IT.
CASTLE QUEST
MICROPOWER
Probably the most challenging game ever devised for the BBC Micro.

Challenging!

CASTLE Quest, the interactive adventure and strategy game with arcade style action and graphics from Micro-Power, is now available for the BBC Micro.

And it comes with a "bet you £1 you can't crack it" challenge from the manufacturer that is valid for three months from date of purchase.

Puzzles

By using the artefacts provided and solving the puzzles correctly the player can successfully conclude his tour of the castle.

For the few who complete the quest the arcade game element comes into play, with high scores and time limits to beat.

At this point players are eligible to enter a £500 competition to find the castle Quest champion of 1985.

The game features the MP4 Scrollerama system with continuous movie-type action enabling the player to move through the scenario from his start point in a full circle, as well as up and down within the limits of the building.

Castle Quest on cassette costs £12.95 and on disc £14.95.

Now Mini Office becomes a national teaching aid

MINI Office, the chart topping business software package for the BBC Micro from Database Software, has been selected as a national teaching aid.

It will now be incorporated as part of a series of special courses held throughout the UK to link education with industry.

Teachers

The training program is organised by the Careers Research and Advisory Centre (CRAC) for sixth form students, undergraduates and careers and business studies teachers.

CRAC is a registered charity funded by most of the UK's blue chip companies ranging from the Abbey National through to Marks and Spencer and Williams & Glyn's Bank.

"Our brief is to increase understanding of business enterprise, the role of management and the kind of skills required", says Maureen Curson, CRAC's course manager.

"So we are very interested in Mini Office to help get our message over".

Mini Office is a professionally written suite of four programs – a word processor, spreadsheet, database and graphics – which converts a BBC Micro into an inexpensive office tool.

Tutorial

It comes with a 32 page operating guide which acts as an easy to understand tutorial.

However it is the revolutionary pricing of the package – just £5.95 – which has guaranteed it being a runaway success. For business software packages often carry price tags of several hundred pounds.

Sculpture prize

BBC Micro users who buy Bourne Educational Software's award winning Osprey program from Boots have a chance of winning a beautiful crystal sculpture.

The competition is split into two sections with prizes for the best individual and group project folders based on the history of the Osprey and its return to Scotland.

Study

Alternatively entrants can produce a study of a local bird of prey compared to the Osprey.

First prize in each section is a specially commissioned Osprey in lead crystal by Swedish sculptor Mats Jonasson. There will be 10 runner-up prizes of copies of The Book of British Birds produced by the Royal Society for the Protection of Birds.

Closing date for entries is June 30.

Fire on two fronts

JOYSTICK distributor Vulcan has produced a new model for the BBC Micro. The £10.95 device plugs directly into the analog digital port on the BBC, has fire buttons configured for both left and right handed players, with four heavy-duty suction pads and a moulded handle designed for single-handed game mastery.

PRIZE BRAIN TEASER

THE most sophisticated computer brain teaser ever devised is how Infomania and Castle Consulting describe their multi user network game, Mung, scheduled for release by midsummer.

Initially 50 or so communications system owners will be able to play the game – which has a 2mbyte main memory – simultaneously.

Magic

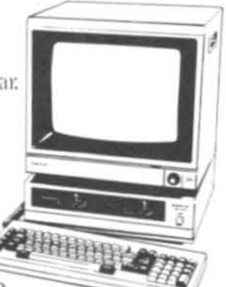
Masterminds will gain access to additional magic and weapons, and the means to devise their own strongholds and traps, for inclusion in the game.

There will be a cash prize for the first person to complete the first scenario, which is expected to take a year to play. Masterminds will be issued with certificates.

SYSTEMS

SANYO 555 Q

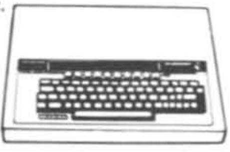
IBM compatible, 128K RAM.
2 x 360K Drives. Price includes: Wordstar, Mailmerge, Info-Star and Calc-Star.



(Monitor available at extra cost) £999

BBC-B £379

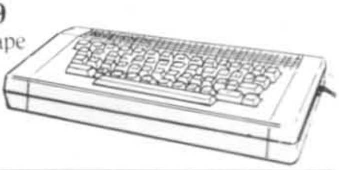
Full range of
Software and Disk Drives available.



BBC-B WITH DDFS £456.00

ELECTRON £189

Includes free software tape



Microware's prices must be hard to pass up!

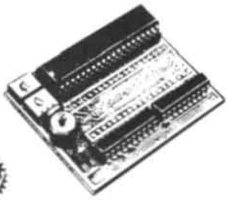
UDM AUTHORISED DEALER

DISK DRIVES

200K–400K–800K

plus new 3½" range
(including manual & formatter)

100k single unit	£99
200k dual unit	£199
200k single unit	£155
400k dual unit	£249
400k single unit	£169
800k dual unit	£299
Switchable	+ £15
PS unit	+ £25
UDM DDFS	£95
WITH Disk Drive	£79 only



PRINTERS

Brother Printer HR 15	£399
Juki Daisywheel 6100	£389
EPSON RX80 FT	£269
EPSON FX80	£379

Including lead for BBC.

MONITORS

Microvitec colour	
Normal res.	£199
Medium res.	£249
High res.	£399
Sanyo BMC 12" C	£110

AP = + £25

Call for our full price list.

DISKETTES

CONTROL DATA
StorageMaster

Control Data, in packs of 10

SS 40tk	£16.00
DS 40tk	£19.98
DS 80tk	£26.00

Including VAT, p&p.

ACCESSORIES

Disk storage boxes................ £15.00 (takes 35)
Disk storage boxes................ £20.00 (takes 80)
Prices include VAT, p&p.

BBC Stands................£15.00
Dust covers...................£5.60
(for BBC, Drives and Printers)

ORDER FORM

Product	Price	Qty.	Total
			£
			£
			£
			£
			£
			£

All prices include VAT & delivery

I enclose my order for the above products.

TOTAL SUM ENCLOSED (Cheque or credit card no.) £________
ALL PRODUCTS ARE BRAND NEW, BOXED AND OFFERED WITH FULL MANUFACTURERS WARRANTY. All prices include VAT & delivery

Feb 85

MICROWARE

14, Charles Street · Hanley · Stoke-on-Trent
· (0782) 269 883
67, Westow St. · Upper Norwood · London SE19
· 01-771 6373
2/4 Paul Street · London EC2
· 01-247 8577
637, Holloway Road · London N19 5SS
· 01-281 2431

Name________
Address________
Signed________

Now micros mimic human nervous system

BBC Micros are helping paralysed people to walk again.

It's happening in Scotland where Edenhall Hospital is testing the ability of computers to mimic the body's nervous system.

Paralysed muscles can be moved by electrical stimulation. By linking the stimulator to a computer, the desired level of movement can be automatically controlled based on pre-determined settings programmed into the BBC Micro.

To induce walking the computer has to control a highly complex process involving the interaction and coordination of several muscle groups and joints.

Already staff at Edenhall are achieving a crude form of movement with sensors positioned on the body to feed back information to the computer.

Eventually it is hoped to produce a miniature device either carried by the patient or implanted in the body which can mimic parts of the nervous system.

Meanwhile the hospital is using 11 BBC Micros, six of them donated by Acorn, to teach high tech skills to the disabled.

Specialist and educational software is helping patients continue their schooling and prepare for future employment.

And video games provide hours of entertainment, helping to cheer up those suffering from the trauma of spinal injury.

The micros are also being used as an aid to communication and control of appliances and to assess patients' mental and physical skills in the rehabilitation programme.

Dr Graham Creasey of Edenhall's spinal unit says: "The computers have proved invaluable in advancing patients' recuperation.

"They make life more pleasant and provide some hope for future employment. A micro can be at least as useful as a wheelchair".

Computer controlled muscle movement being applied to patient Douglas Herd at the spinal unit of Edenhall Hospital. At the controls is Dr Graham Creasey.

..and help Colin build a new and rewarding life

PARALYSED from the chest down in a swimming accident 15 years ago, Collin Paterson has built a new and rewarding life for himself with the help of his BBC Micro.

The broken neck sustained while larking about on a beach near his home town of Eyemouth, Berwickshire, when he was 21 ended Collin's hopes of taking up a career in mechanical engineering with British Steel.

When he returned home from hospital two years later Collin wanted to complete his engineering course and take the HNC examination.

But he was told he would have to make at least 23 trips to Glasgow to prepare for the exam, a requirement it was not possible to meet.

Undaunted, Collin turned his attention to maths, took a National Extension College refresher course and began working for his Open University degree in 1975.

Years of hard work, frequently interrupted by illness and periods in hospital, finally paid off with a BA.

Now he is studying for an honours degree in computing – a logical step, as Collin's BBC Micro has become his major educational tool and source of enjoyment.

Complicated surgery has enabled him to use the slight movement in one shoulder to trigger his right bicep and operate a prodder strapped to his hand.

With this he operates a Possum control panel which governs all his electrical appliances, answers the telephone and switches TV channels.

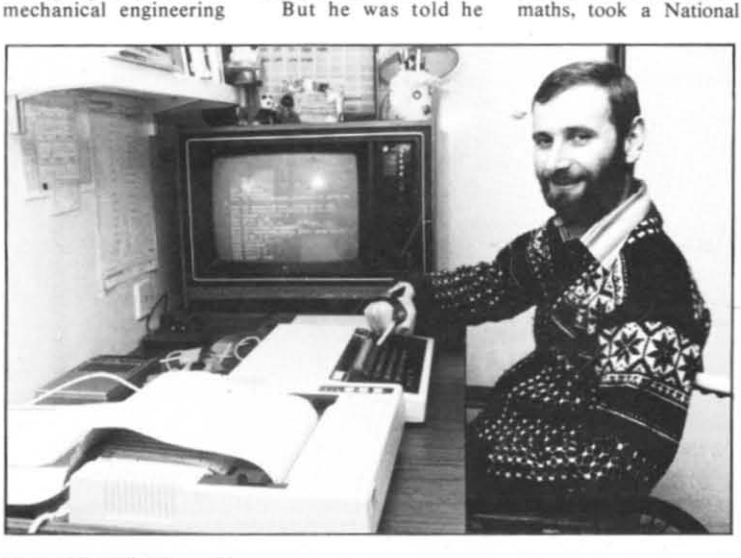
With the help of a friend he is designing a joystick device that will allow him to play chess with his micro.

And he has been saving up to buy a modem so he can access databases and communicate with other micro users.

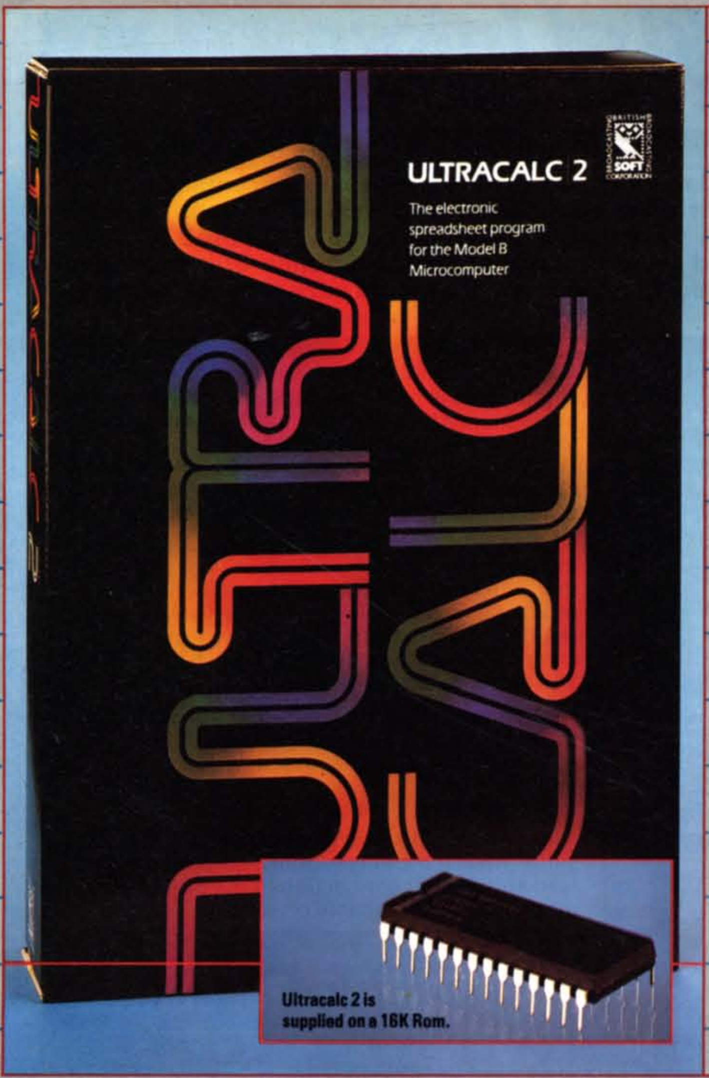
But don't get the idea that Collin's world consists only of himself and his computer.

For years he has been tutoring local youngsters in maths – voluntary work that led to him experiencing his greatest thrill four years ago.

Berwickshire District Council rewarded Collin's community service with a trip to a Holyrood Palace garden party where he saw the Queen and other members of the Royal Family and was introduced to the Duke of Edinburgh.



Collin Paterson ... now he is studying for an honours degree in computing


ULTRACALC 2
The electronic spreadsheet program for the Model B Microcomputer
BRITISH BROADCASTING SOFT CORPORATION

Ultracalc 2 is supplied on a 16K Rom.

ULTRACALC 2

A powerful spreadsheet program for businessmen, scientists, accountants and everyone who needs ultra-fast calculations. It transforms your Model B computer into a fast and flexible calculation system.

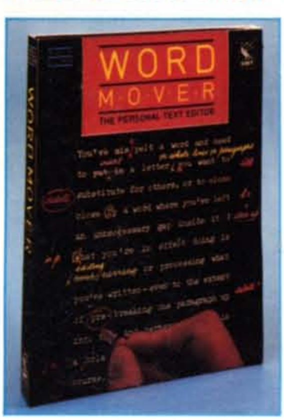
Use Ultracalc 2 for budgets, cash-flow forecasts and 'What if?' projections; for price lists, time sheets and stock control; for scientific calculations, or as a compact data-base. A full range of editing and display options enables you to adapt the spreadsheet to suit your needs.

Ultracalc's built in features include:–

- Simple communication with the program
- Wide choice of editing, display and printing options
- Output can be fed to a word processor
- Efficient memory usage, enabling large spreadsheets to be compiled
- Operates with 6502 second processor

If you already have Ultracalc you can upgrade it to Ultracalc 2 for only £6.25. Write for an application form to Software Editor, BBC Publications, 35 Marylebone High Street, London W1M 4AA, enclosing a stamped addressed envelope.

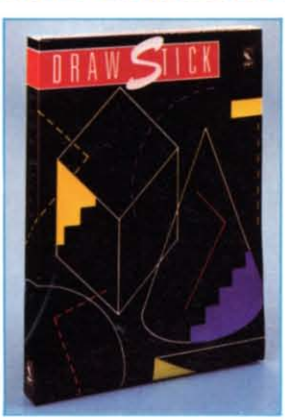
PLUS MANY MORE EXCITING PROGRAMS INCLUDING:


WORD MOVER
THE PERSONAL TEXT EDITOR

WORD MOVER

An ingenious program offering many of the features of a word processor – with none of the complications!

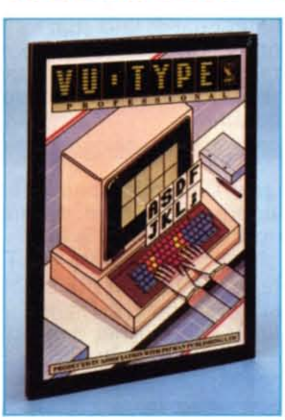
Cassette: £9.95



DRAWSTICK

A versatile design aid for children and adults. Use it for pictures, diagrams or as a CAD tool.

Cassette: £9.95


VU·TYPES
PROFESSIONAL
ASDF
JKL;

VU-TYPE PROFESSIONAL

An exciting, easy-to-use typing tutor with colourful graphics and Pitman-approved exercises to increase your speed and accuracy.
Disc: £21.95

All software is for the British Broadcasting Corporation Model B Microcomputer and is available from booksellers and computer shops. Prices include VAT.

BRITISH BROADCASTING SOFT CORPORATION

Access a world of Information
WITH YOUR BBC MICRO

Today, there are literally hundreds of databases worldwide which can be accessed by your BBC micro. These include Prestel, Micronet, Homelink, Telecom Gold, various 'Bulletin Boards' and massive American data bases such as 'The Source' and 'DIALOG'. The equipment can also be used to send telex messages. The Pace range of inexpensive communications products are designed to provide accurate data exchange whilst being extremely flexible and easy to use.

NIGHTINGALE - The Modem

NIGHTINGALE
NIGHTINGALE
MULTI FUNCTION MODEM
PACE
APPROVED for use with telecommunication systems run by British Telecommunications in accordance with the conditions in the instructions for use
S/2592/3/E/500065

Nightingale is by far the most versatile modem available, at the price, for either home or business use. It offers Prestel/Viewdata baud rates (1200/75 & 75/1200) alongside 300/300 baud full duplex for communication between the BBC and other computers, including bulletin boards.

Nightingale has a built-in expansion capability, allowing the addition of auto-answer and auto-dial with battery back-up. The state-of-the-art modem chip technology employed in Nightingale requires minimal support circuitry resulting in low power consumption, low cost, high quality and extreme reliability.

Nightingale being 'hard wired' is not subject to the noise interference errors common to outdated acoustically coupled devices. In addition Nightingale features a simple self-test facility for easy installation.

Nightingale utilises a fully buffered RS 423/232 serial interface and is supplied complete with a lead suitable for connection to the BBC micro, other leads are available on request.

In order to use a versatile modem like Nightingale to its fullest potential, you will require equally sophisticated software. This is where Pace can offer you a total solution — Commstar, unquestionably the most comprehensive communications software available for the BBC.

Commstar is currently the only package for the BBC micro which offers easy access to Prestel (and other viewdata services), together with user to user communication and exceptional file transfer capabilities.

Supplied on Eprom, Commstar is instantly accessible, simple to use and extremely flexible. Just look at the possibilities:- access Prestel, Micronet, Viewfax, Homelink and Telecom Gold, rummage through bulletin boards and chat to literally thousands of other computer users, but there's more. Commstar's versatility enables the BBC to be used as an inexpensive work station for a main frame or mini-computer.

COMMSTAR - The Software

PACE
commstar
PACE
commstar

The complete Nightingale/Commstar package for the BBC micro including the modem, cabling and the Commstar Eprom and manual is just £139 plus V.A.T.

Nightingale is available separately for the BBC and other computers at £119 plus V.A.T. and Commstar is £29.57 plus V.A.T. Further details are available, please telephone or write for comprehensive fact sheets.

SPECIAL INTRODUCTORY OFFER

For a limited period, when you order the Nightingale modem you will receive discount vouchers entitling you to the following:-

KNOWLEDGE-INDEX

20% discount off standard enrolment fee (normally £25)

This remarkable collection of databases includes over 22,000,000 items covering Agriculture, Books, Business, Electronics and Computing, Corporate and Company News, Education, Engineering, Government Publications, Legal Information, Magazine Articles, Mathematics, Medicine and News/Current Affairs (The enrolment fee also includes 2 hours of free access time).

one to one

50% discount off standard enrolment fee (normally £50)

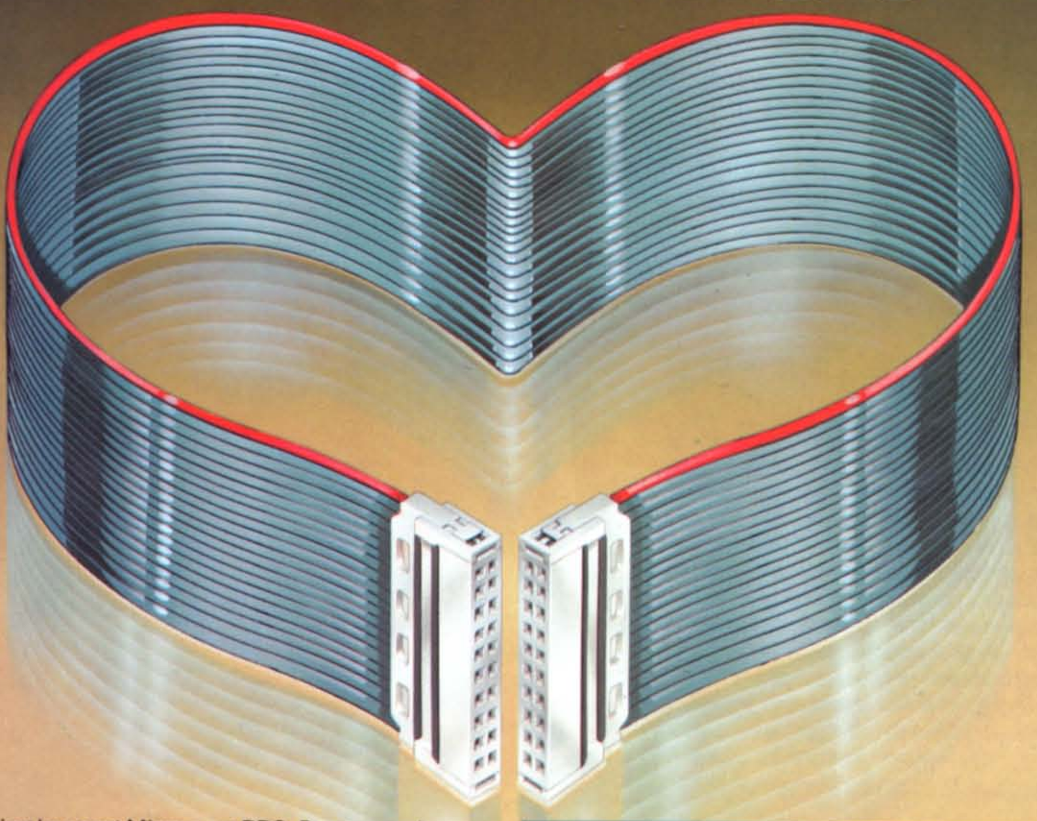
One to one is an electronic message service designed to give you the communications capabilities of a telex at much lower cost. By using your micro fitted with a Nightingale modem you can produce telexes, letters, reports and contracts, and send them in seconds to any destination. Courier delivery, priority mail and radio paging are also included in this highly efficient communications service.

PACE

**PACE, 92 NEW CROSS STREET,
BRADFORD. BD5 8BS
Tel. (0274) 729306 Telex 51564**

"Bringing tomorrow a little closer"

WHY MICROS LOVE MT80



Most leading low cost Micros, eg BBC, Dragon and Sinclair QL love the MT-80 printer from Mannesmann Tally. It is fully hardware compatible and with a range of cable options, gives trouble-free straight through plug-in facilities.

You'll love it too, for its sophisticated looks, and its range of *standard features*, which include 80 col, 80 cps optimised bi-directional printing with dot addressable and line graphs, quick tear-off facility, friction and tractor feed, and easy change cassette ribbon. And all for an ex-VAT price of around £200.

Options include <55dBa sound reduction kit and 2K buffered serial interface.

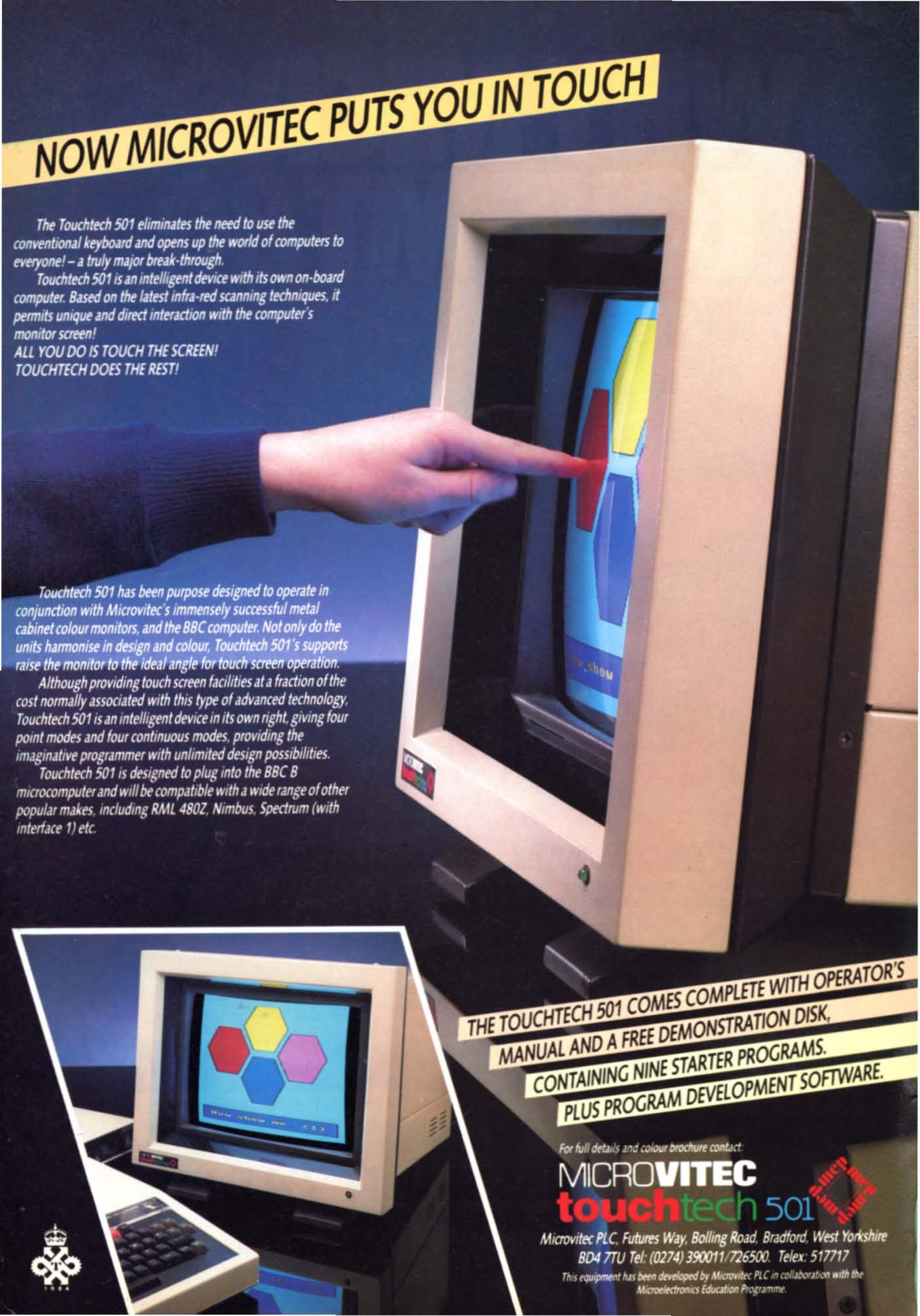
The dealer who supplies you is supported by Mannesmann Tally, Europe's leading printer manufacturer. Your guarantee of continued support and assistance throughout the life of the printer.

Ask your nearest dealer for a demonstration, or phone us today for full details. Either Annie, Sali, Terry or Geoff will be only too pleased to help you.

MANNESMANN *TALLY*

THE FIRST NAME IN PRINTING

Mannesmann Tally, Molly Millar's Lane, Wokingham, Berkshire RG11 2QT
Telephone (0734) 791619/791533 Direct Lines or (0734) 788711 Switchboard



NOW MICROVITEC PUTS YOU IN TOUCH

The Touchtech 501 eliminates the need to use the conventional keyboard and opens up the world of computers to everyone! – a truly major break-through.

Touchtech 501 is an intelligent device with its own on-board computer. Based on the latest infra-red scanning techniques, it permits unique and direct interaction with the computer's monitor screen!

ALL YOU DO IS TOUCH THE SCREEN!
TOUCHTECH DOES THE REST!

Touchtech 501 has been purpose designed to operate in conjunction with Microvitec's immensely successful metal cabinet colour monitors, and the BBC computer. Not only do the units harmonise in design and colour, Touchtech 501's supports raise the monitor to the ideal angle for touch screen operation.

Although providing touch screen facilities at a fraction of the cost normally associated with this type of advanced technology, Touchtech 501 is an intelligent device in its own right, giving four point modes and four continuous modes, providing the imaginative programmer with unlimited design possibilities.

Touchtech 501 is designed to plug into the BBC B microcomputer and will be compatible with a wide range of other popular makes, including RML 480Z, Nimbus, Spectrum (with interface 1) etc.

THE TOUCHTECH 501 COMES COMPLETE WITH OPERATOR'S MANUAL AND A FREE DEMONSTRATION DISK, CONTAINING NINE STARTER PROGRAMS. PLUS PROGRAM DEVELOPMENT SOFTWARE.

For full details and colour brochure contact:

MICROVITEC
touchtech 501

Microvitec PLC, Futures Way, Bolling Road, Bradford, West Yorkshire
BD4 7TU Tel: (0274) 390011/726500. Telex: 517717

This equipment has been developed by Microvitec PLC in collaboration with the Microelectronics Education Programme.

Watford Electronics

Dept. BBC, 250 High Street, WATFORD, ENGLAND
Tel: Watford (0923) 40588/37774 Telex: 8956095 WAELEC
ACCESS ORDERS Tel: (0923) 50234

SPECIAL OFFER

BBC Micro 'B'
Only: ~~£315~~ £299

Price includes FREE 5 games software packages

NEW

BBC MICRO 32K + 32K

(includes extra 32K RAM card already fitted)

Only: **£379**

6502 2nd PROCESSOR	**£175**
Z80 2nd PROCESSOR	**£339**

TORCH Z80 DISC Pack	**£695**
TORCH Z80 2nd Processor	ONLY **£295**

(Securicor carriage on Micros £7)

BBC Micro with ECONET	**£375**
ECONET Upgrade Kit	**£55**
File Server Level 1	**£85**
File Server Level 2	**£215**
Printer Server EPROM	**£41**
Terminators (Pair)	**£60**
Clock with PSU	**£35**
10 Station Lead Set	**£25**
ECONET User Guide and Cable	**£10**
TELETEXT Adaptor	**£195**
Acorn Bitstick	**£328**

Dust Cover for BBC Micro

Protects your expensive Micro from foreign bodies while not in use. **£3.50**

PRINTERS

● EPSON RX80 Printer	**£209**
● EPSON RX80 F/T Printer	**£219**
● EPSON FX80 Printer	**£316**
● EPSON FX 100 Printer	**£429**
● SEIKOSHA GP100A	**£122**
● Centronics PRINTER CABLE for all the above printers to interface with the BBC Micro.	**£7**

(Securicor carriage charge on printers £7)

RX & FX PRINTER INTERFACES

Epson interfaces fit inside the printer to allow connection using techniques other than Centronics.

RS232	**£35**	RS232 + 2K Buffer	**£59**
IEEE 488	**£65**	2K Parallel	**£58**

COLOURJET PRINTER

Integrex 36 Colour Ink jet printer. Prints in all modes incl. mode 7. Prints overhead transparencies. Centronics parallel interface. 40 CPS in full colour. 640 dots/line + 1280 dots/line high res mode. Double strike mode. 84 dots/inch both axis. Friction feed rollpaper with single sheet feed A4. Virtually silent. FREE BBC dump listing.

Introductory Offer: **£525**

Type	Ribbons	Dust Covers
MX100/FX100	£10.00	£5.25
FX80/MX80	£4.75	£4.95
RX80	£4.75	£4.50
GP80	£4.50	–
GP100	£4.95	£3.95
GP250	£5.95	£3.95
KAGA KP810	£5.95	£4.75
CANON PW1080	£5.95	£4.75
MICROVITEC MONITORS	–	£5.50

4 COLOUR PLOTTER PRINTER

SAKATA SCP-800 printer/plotter facilitates plotting & printing in 4 colours on paper upto A4 size, using easily replaced pens. In text mode it prints upto 12 CPS. Max 160 Char. per line. In graphics mode it offers full plotting facilities incl. drawing, moving, scaling of text, rotation & drawing of axes. (Write for a sample printout).

Only £175

(Our COLOUR DUMP ROM worth £22 supplied ABSOLUTELY FREE with every plotter purchased during this month).

PRINTER SHARER

Allows 3 BBC Micros to be connected to one Printer.

Only: £65

BROTHER HR-15
DAISY-WHEEL PRINTER

Brother HR15 is a high-quality daisy-wheel ideal for a budget printer for serious use. Notable features of this printer include a 3k buffer, 18cps (max), bi-directional printing, proportional spacing, Centronics or RS232 interfaces as standard, optional sheet feeder and an optional keyboard.

ONLY **£329** (carr. £7)

Single Sheet Feeder	**£195**
Electronic KEYBOARD	**£135**
TRACTOR FEED Attachment	**£90**

RIBBON CARTRIDGES:

Fabric **£3.75;** Carbon **£3.75;** Multistrike **£6**

DAISYWHEELS (various typefaces)	**£18**

Listing Paper (Plain)

1,000 Sheets 9½" Fanfold Paper	£7
2,000 Sheets 9½" Fanfold Paper	£13
1,000 Sheets 15" Fanfold Paper	£9
Teleprinter Roll (Econo paper)	£4

Carriage on 1,000 Sheets £1.50

PRINTER LABELS
(On continuous fanfold backing sheet)

1,000 90×36mm	£5.50
1,000 90×49mm	£7.75
1,000 102×36mm	£6.25

Carriage on Printer Paper or Labels £1.50
Carriage on 1,000 Labels £1.00

All prices exclude VAT

SPECIAL OFFER

HITACHI EPROMs for Sideways ROMs

2764-250nS £4.25
27128-250nS £9.75

RAMs (Low power) for ATPL, WATFORD, etc., Sideways ROM Boards

6116LP (2K) £3.25
6264LP (8K) £9.95

FIRMWARE

ACORN 1.2 DNFS ROM	**£15.00**
ACORN 1.2 OS ROM	**£10.00**
ACORN BASIC 2	**£30.00**

(Maximum of 5 ROMs or RAMs of any one type per order). Dealers inquiry welcome.

KAGA KP810

This new Japanese printer has EPSON FX/RX compatible control codes and is functionally equivalent to an FX80 with the added advantage of its 'Near Letter Quality' mode. It is solidly built and features include: Normal, Italic, Enlarged, super/subscript, proportional spacing and user-defined character set. Extras over the FX80 included in the price are Near Letter Quality (NLQ) print ideal for correspondence, Proper adjustable tractor feed, half speed quiet mode and 3K buffer. The printer is bi-directional and logic seeking to give a speed of 140CPS for high throughput in conjunction with the standard 3K buffer. 8K RAM may be added to give more user-defined character sets. Centronics parallel interface + Watford's 12 month NO QUIBBLE WARRANTY.

Special Offer: ONLY **£249** (£7 carr.)

RS232 interface + 2K buffer to connect to other micros. **£89**

KAGA KP910 Printer

Similar to the KP810 but with 17" carriage for wide print. Gives 156 columns of normal print or 256 columns in condensed mode. Ideal for printing out spreadsheets.

ONLY **£339** (£7 carr.)

PRINTER LEAD

Centronics lead to connect BBC micro to EPSON, KAGA, SEIKOSHA, NEC, STAR, JUKI, BROTHER, SHINWA etc. printers.

Standard length (4 feet long)	£7
Extra long (6 feet long)	£9

Continued →

3M - 5¼" DISKETTES

Top quality 3M – SCOTCH Diskettes from Watford Electronics (Your 3M Appointed Distributors). All discs carry a lifetime warranty. These discs are quiet in operation and insert positively with their reinforced hub rings. Boxes of 10 supplied complete with self stick, disc labels and write protect tabs.

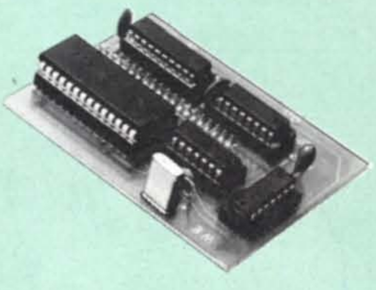
DON'T SETTLE FOR LESS, BUY THE BEST

● 10	S/S D/D	40 Track Diskettes	£14
● 10	D/S D/D	40 Track Diskettes	£18
● 10	S/S D/D	96 Track Diskettes	£22
● 10	D/S D/D	96 Track Diskettes	£24

Access

ACCESS HOT LINE (0923 50234)
24 Hours

DOUBLE DENSITY
DISC INTERFACE



SIMPLE but SOPHISTICATED

We are proud to bring to you the Watford Electronics Double Density Board for the BBC Micro.
The DDFS supplied is a new version of the popular Watford Electronics DFS re-written to make full use of the capabilities of the new double density controller.

- Increases storage capacity of your Disc Drives by the maximum physically possible, 80% !!!
- Our system will use the whole of an 80 track drive. Inferior systems do not allow files longer than &3FFFF bytes, but with our system files can be as long as one disc side.
- Discs may be created in either single or double density format with the built in formatter and in single density mode are fully compatible with normal Acorn format discs.
- The density of the disc you put in is automatically sensed by the system and you are informed of the density in the catalogue display.
- The double density system is of course faster than single density.

The Watford Electronics DDFS implements an extremely comprehensive 8271 emulator so that commands passed through OSWORD & 7F are correctly interpreted. Other manufacturers thought that read and write sector alone were sufficient – we decided to implement every command of the 8271 that was physically possible. We have allowed the use of all the special registers including bad tracks, allowed access to deleted data etc., etc. The emulator itself takes up around 1K of compactly written machine code. We reckon it will run many of the protected discs now available. Gain all the advantages of the WE DFS together with much increased storage and compatibility with many existing protected discs.
(please write-in for full technical specifications)

Complete Unit incl. DDFS ROM	£85
DDFS Manual	£6.95 (no VAT)
We will exchange your existing Single Density Interface for our DDFS Unit for	£49

(Carriage £1.50)

THE ULTIMATE DFS

Watford are proud to be able to supply both SINGLE and DOUBLE DENSITY versions of their highly acclaimed Acorn compatible DISC FILING SYSTEM.
Single Density DFS runs Acornsoft's ELITE.

What do the independent press say?
"Good value for money" – Beebug
"A very worthwhile package" – The Micro User
"You'll be buying a very powerful package" – Personal Computer News
"Superior DFS; Excellent disc sector editor" – Computer Answers

Without a doubt the most sophisticated DFS software yet written for the BBC microcomputer. This powerful DFS is fully compatible with the ACORN DFS, yet has much increased power due to the additions, carefully designed to make life easier in normal use. It consists of 16K of efficiently written machine code. It is entirely self contained and so does not require a utilities disc to function.

SPECIAL OFFER

● DFS (Disc Filing System) ROM only	£18
● Complete Disc Interface Kit Incl. DFS ROM & fitting instructions	£89
● Acorn's DFS Kit complete	£86
● DFS Manual (comprehensive)	£7
● We will exchange your existing Acorn DFS for Watford's ULTIMATE DFS for	£14

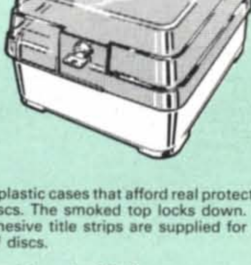
P.S.
We will exchange your existing ACORN DFS for Watford's highly sophisticated DFS ROM for .... **Only: £18**

Watford's DFS is exclusively available from Watford Electronics. We DO NOT retail this product through dealers. Every ROM carries a printed label with our LOGO and a serial number.

THE FEATURES OF WATFORD'S SINGLE & DOUBLE DENSITY DFS.

- The system can either use the ACORN standard 31 files per disc side or DOUBLE THE NUMBER to 62 files. The size is selected at formatting time. Copying between discs with different catalogue sizes works perfectly normally.
- A FORMATTING PROGRAM is built in, permitting formatting to 35, 40, 80 track formats with either 31 or 62 files. Since the formatter is built into the DFS it can be used without affecting whatever program you are using.
- A DISC VERIFIER is also built in. This checks the internal checksums on each sector to identify any corrupted data. This is extremely useful when saving valuable data as it shows faulty discs quickly and easily. Again it does not affect the program you are using.
- A built in DISC SECTOR EDITOR gives a screen window onto the disc enabling detailed editing of any byte on the disc. This is extremely useful for recovering accidently deleted files and can save weeks of work.
- A double step mode allows the user of 80 TRACK DRIVES TO READ AND WRITE BOTH 40 & 80 TRACK DISCS. This mode is software selected for each drive individually, thus allowing a 40 track disc to be copied onto an 80 track one very easily. THIS ELIMINATES THE NEED FOR EXPENSIVE SWITCHABLE DRIVES.
- A WORKFILE function sets the name to be used when the null filename is issued. This allows a program to be edited and repeatedly saved having only typed its name once. Automatic increment function SAVES successively numbered versions of a file, every time SAVE is used.
- When using LOAD, CHAIN etc., it is possible to specify an ambiguous filename. This will result in the first file whose name matches the specification being used. This saves typing the end of a filename that you know is uniquely identified by its first few characters.
- Two commands exist to simplify the transfer of programs from TAPE TO DISC. These load the file to &1100, switch off the disc system and then move the file to its correct load address, thus saving a lot of complicated programming. This command can be used to load files upto 27.75K long.
- An advanced COPY command is included which will prompt the user, requesting whether to copy each file.
- RENAME has been extended to allow the use of ambiguous filenames. This allows you to change BERT1, BERT2, BERT3 to FRED1, FRED2, FRED3 with only one command, much as you would on a mainframe!
- OPENOUT has been improved to give you fewer annoying 'Can't extend' errors, as it automatically picks the biggest space on the disc in which to put a file. A SPACE command lets you know how much space *COMPACT will create before you waste time compacting and possibly losing your program.
- 2K of RAM can be reclaimed from the DFS by setting "PAGE" to &1100.
- The DFS is fully compatible with TELETEXT, TORCH and both ACORN Second Processor systems. Discs prepared with the Watford DFS can be used under ACORN DFS without any changes, so there are no problems in exchanging software with ACORN DFS users.
- A comprehensive and clearly written manual is available seperately and this explains both the standard ACORN functions and the extra WATFORD features.

LOCKABLE DISK STORAGE UNITS



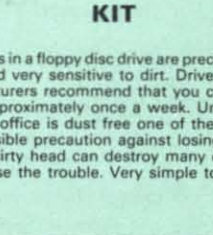
Strong plastic cases that afford real protection to your discs. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

M35 holds upto 40 discs	£13
M85 holds upto 95 discs	£17

FLOPPY HEAD CLEANER KIT

The heads in a floppy disc drive are precision made and very sensitive to dirt. Drive manufacturers recommend that you clean the heads approximately once a week. Unless your home or office is dust free one of these kits is a very sensible precaution against losing valuable data. A dirty head can destroy many disks before you realise the trouble. Very simple to use.
Only **£9**

PLASTIC LIBRARY CASES



for Disc Storage 5¼" (holds 10) **£1.80**

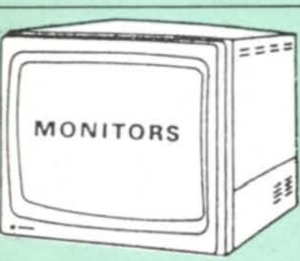
BBC MICRO WORD-PROCESSING PACKAGE

A complete word-processing package (which can be heavily modified to your requirements, maintaining the large discount). We supply everything you need to get a BBC micro running as a word-processor. Please call in for a demonstration.

EXAMPLE PACKAGE
BBC Model B, Watford Electronics' DFS upgrade, WORDWISE ROM, Twin 200k Teac drives in beige, Zenith 12" Hi-resolution monitor (Green or Amber), Brother HR15 daisywheel printer. Gemini software: BEEBCALC spreadsheet, analysis and DATABASE software on disc. 10 × 3M disc, 500 sheets fan-fold paper, 4 way mains trailing socket, manuals, all leads and BBC carrying case.

NEW LOW PRICE

Only £1,089



We stock a range of monitors to suit all needs. Choice of a monitor is a matter of personal taste so we recommend that whenever possible, you ask for a demonstration at our shop.

MICROVITEC

- 1431 – Medium resolution as used on the BBC television computer programme **£165**
- 1451 – High resolution, suitable for word processing in mode 0 .... **£237**
- 1441 – High res, exceeds the capabilities of the BBC micro **£385**
- 1431AP RGB + PAL and AUDIO **£199**
- 1451AP RGB + PAL and AUDIO **£305**
- Dust Cover for Microvitecs **£5.50**

All Microvitec Monitors are 14" RGB in their distinctive right angle sturdy metal case or the new beige plastic case. They are supplied complete with connecting lead to the BBC and a 3pin mains plug.

KAGA

- KAGA Vision 2 High Res. Colour **£225**
- KAGA Vision 3 Super High resolution, Colour **£310**

Kaga Monitors are 12" RGB colour units housed in an attractive beige plastic cabinet. They all have as standard, a genuine etched anti-glare screen.

ZENITH

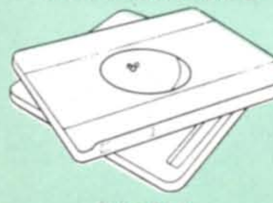
12" Ultra high resolution monochrome monitor. Ideal for word processing as its green or amber screen is very restful to read. The high resolution makes it good for games too – you can really see the detail that has been put into the graphics .... ONLY **£68**

LEADS

BNC Lead for Zenith or Philips **£3**
RGB lead for KAGA **£5**

N.B. Carriage on Monitors **£7** (securicor)

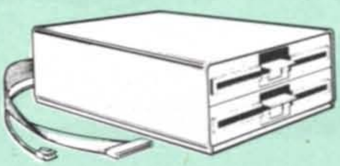
SWIVEL BASE FOR MONITORS



Only £15

DISC DRIVES PRICES SLASHED

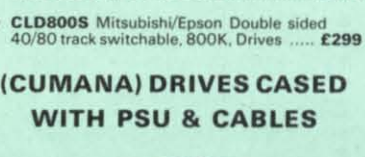
(NEW SLIM-LINE DRIVES)



(DRIVES Cased with Cables. No PSU. Connects directly to the BBC's power socket.)

- **CLS 100** Single, TEC Single sided 40 track 100K, 5¼" Disc Drive **£89**
- **CLS200** Single EPSON Drive, Double sided 40 track, 200K, 5¼" **£99**
- **CLS400** Single, Mitsubishi/Epson Double sided 80 track 400K, 5¼" Disc Drive **£126**
- **CLS400S** Single, Mitsubishi/Epson Double sided 40/80 track Switchable, 400K, 5¼" Disc Drive **£145**
- **CLD200** TEC Single sided 40 track 200K twin 5¼" Drives **£165**
- **CLD400** Epson, Double sided 40 track 400K, 5¼" TWIN Drives **£199**
- **CLD800** Mitsubishi/Epson Double sided 80 track 800K, 5¼" TWIN Drives **£235**
- **CLD800S** Mitsubishi/Epson Double sided 40/80 track switchable, 800K, Drives **£299**

(CUMANA) DRIVES CASED WITH PSU & CABLES



- **CS100** TEC Single sided 40 track 100K 5¼" Single Disc Drive **£119**
- **CS200** Epson Double sided 40 track 200K 5¼" Single Disc Drive **£149**
- **CS400** Mitsubishi/Epson Double sided 80 track 400K 5¼" Single Drive **£165**
- **CS400S** Mitsubishi/Epson Double sided 80 track 400K 5¼" Single Drive **£179**
- **CD200** TEC Single sided 40 track 200K 5¼" TWIN Disc Drives **£236**
- **CD400** EPSON Double sided 40 track 400K 5¼" TWIN Disc Drives **£280**
- **CD800** Mitsubishi Double sided 80 track 800K 5¼" TWIN Drives **£339**
- **CD800S** Mitsubishi Double sided 40/80 track Switchable 800K TWIN Drives **£350**
- SPARE DRIVE CABLES, SINGLE **£6**; DUAL **£8**
- DFS Manual (comprehensive) **£7** (No VAT)

(Carriage on Disc Drives £7 securicor)

P.S.
- You do not require a formatting Disc nor the expensive 40/80 track switchable Drives when using Watford's sophisticated Disc Filing System which has this facility as one of the many facilities incorporated in it as standard.

Cont.

- MITSUBISHI & EPSON Slimline 400K Disc Drives that we supply are Double sided Double Density, 1 Megabyte unformatted, (With BBC Micro 400K after formatting). When used in conjunction with our Double Density Interface, you obtain 725K formatted. Track density is 96 TPI, track to track access time is 3mSec. These drives are very fast, quiet and efficient. We strongly recommend them.
- Extensive test carried out in our workshop has proved that the BBC Micro's own switchmode power supply is capable of driving 2 disc drives and a host of Sideways ROMs without undue heating. We recommend our CLS & CLD range of Disc Drives which will save you considerable expense without sacrificing performance.
- Please send an SAE, for further technical specification on our Disc Drives.

DUST COVERS

(For our Disc Drives)

Single (without PSU)	**£3.20**
Twin (without PSU)	**£3.85**
Single (with PSU)	**£3.25**
Twin (with PSU)	**£3.90**
Twin (side by side with PSU)	**£3.95**

DISC ALBUMS

Attractively finished in beige leather-look vinyl, these conveniently store up to 20 discs. Each disc can easily be seen through the clear view pockets.

£4.25

FORTH ROM for BBC

This ROM provides a complete implementation of the FIG-FORTH standard (including editor). Supplied with a large tutorial manual at only **£32**

TINY PASCAL for BBC Micro £54

All prices exclusive of VAT

MYSTERIES OF DISC DRIVES & DFS REVEALED

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

For instance, what is the difference between single and double density formats, how can you use a 40 track disc on an 80 track disc drive? What is the difference between a DFS and disc interface kit? Should you acquire a single Disc drive or twin? What does 48 TPI and 96 TPI discs mean? These are just a few of the questions you may have asked yourself and never found the answer or maybe you have yet to encounter these questions.

Now the mystery of buying a suitable interface and disc drive for your BBC micro is revealed in Watford Electronic's new book entitled 'MYSTERIES of DISC DRIVES & DFS REVEALED'. It describes in fine detail, yet remaining very readable to the beginner, how disc drives operate, the type of interfaces available, which type of discs to use on a disc drive and how data is stored on the discs.

There is even a handy section describing the phrases you are likely to encounter, and how to interpret them. This book must be an essential purchase at £5.95, especially if you own or are thinking of buying a disc system.

£5.95 (Book No VAT)

Continued →

THE EPSON FX/KAGA PRINTER COMMANDS REVEALED

for the BBC Microcomputer
(The only Printer Book for the Epson FX-80 compatible printers).

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

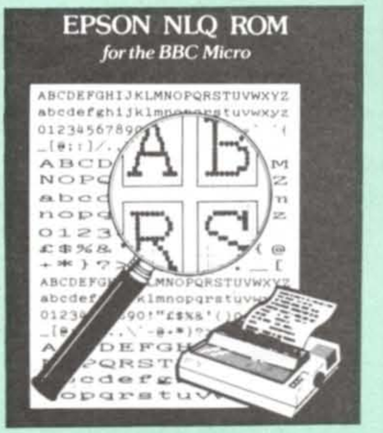
Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX/KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English how to use your printer (Kaga KP810, Canon PW1080A, or any other Epson FX-80 compatible printer) with the BBC micro, both from Basic and your Wordwise wordprocessor.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

This book is superb value at only
£5.95 (Book – No VAT)

EPSON FX/RX NEAR LETTER QUALITY PRINT ROM



Impress your friends and business colleagues with the quality of your letters and printed material with Watford's very simple to use EPSON NLQ! (Near Letter Quality) ROM. Suitable for FX80, RX80, RX80F/T, FX100.

Look at the features:

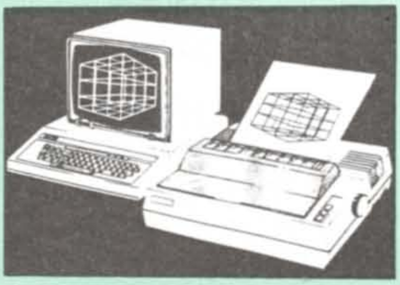
- Simply type *NLQ80/100 and a single VDU code to use NLQ print.
- NLQ is then available without any modifications from BASIC, WORDWISE, VIEW (with NLQ DRIVER) or virtually any other program or language.
- Single codes select PROPORTIONAL type (yes even on the RX80); ENLARGED type; UNDERLINED type. These features can be used seperately or in any combination.
- Full UK character set.

Standard 'pica size'
Proportional spacing
Enlarged
Underlined
Normal type

The NLQ ROM is incredibly easy to fit and use. Supplied complete with Manual.

Only: £20

DUMPOUT 3
NOW WITH EXTRA FEATURES!



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including all Mode 7 facilities etc. We have to admit that there is one facility that we cannot replicate – if anyone can supply flashing ink we would like to know!

The ROM also provides window setting utilities and two new OSWORD calls that allow mode 7 graphics pixels to be read and plotted using the standard graphic co-ordinate system. The latest version includes a graphic dump trigger for dumping screens from games whilst they are running.

Two commands are used to operate the dump routines:
*GIMAGE – This provides a full graphics dump of any Mode (including Mode 8). There are many optional parameters but you need only specify the parameters you wish to change.

- V <scale>, H <scale> – These 2 byte numbers give fine control over the size of the dump from minute to enormous. Unlike other dump ROMs, scale works the same in all modes inc. mode 7.
- R <0-3> – Print dump rotated by 0, 90, 180, 270 degrees.
- I <indent> – Set gap from left edge of paper.
- X <min><max>, Y <min><max> – Selects screen area, by default the whole graphics window is dumped.
- P – Dump shows physical colour values.
- G – Grey scale reproduction, dumps otherwise use a negative scale (white prints darkest).
- T Two tone dump for maximum resolution.
- M <mask> – 8 bit colour mask.
- E – Contrast expansion to make mode 7 text and separated graphics stand out clearly from the background.
- C – All mode 7 graphics are printed as contiguous to improve the shading in graphic areas.
- K – Key-triggered dump. The dump does not commence immediately, but can be triggered off later by pressing <SHIFT><0> or <CTRL><ESCAPE>.
- S – Switch-triggered dump. As K, but the trigger is an external switch (not supplied) connected to the user port. The S option can still work with games that corrupt RAM page D.

*TIMAGE <indent> – Does a fast, text only, dump of the contents of the text window in any mode.

*GWINDOW and *TWINDOW – These commands draw the graphics and text windows, respectively, on the screen and allow them to be changed with the cursor keys. Note that GIMAGE and GWINDOW work fully in mode 7. Designed for use with the following printers: CP80, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, LPVII, NEC PC8023, DMP100/120/200/400, etc. etc.

Price including comprehensive manual
.... **£22**

VIEW

VIEW WORDPROCESSOR
We are supplying the new VIEW version 2.1 allowing printing of memory contents etc **£46**

HI-VIEW

A special version of VIEW designed for use with 6502 2nd Processor. Available on disc, it offers 47K of text memory.
.... **£49**

VIEWSHEET (Acornsoft) **£49**

Watford's own Sophisticated VIEW Printer Driver for FX80

To simplify using the full facilities of the Epson FX80 or Kaga KP810 use this printer driver. Full facilities are provided for selecting between fonts etc. The disc includes examples of use and instructions. Available on 40 or 80 track disc (please state which required). **£6**

VIEW DRIVERS FOR JUKI & BROTHER PRINTERS

Only £7

VIEW/VIEW SHEET PRINTER DRIVER for SILVER REED

(Officially approved by Silver Reed)

A range of VIEW Printer drivers to complement the Silver Reed range of printers EXP400/500/550 & 770 and converted typewriters EX43/44 & 55.

Only: £7

BEEB PRINTER ROM

"Makes Printing Childs Play"

This utility ROM is designed to simplify using all the facilities of your printer. It has many facilities:

★ Selection of printer modes such as underline, font and size is by 'Single Key' operations.

★ From Wordwise, a single number following OC will select a mode rather than a long and incomprehensible string of control codes. This makes using your printer with Wordwise much more convenient.

★ When using Basic (or other languages) you can have control over the formatting of the output to the printer in the style of a wordprocessor. You can define page top, bottom and side margins etc. with intelligent page skip for binders an option. All supported printers will now respond to form-feed etc. commands.

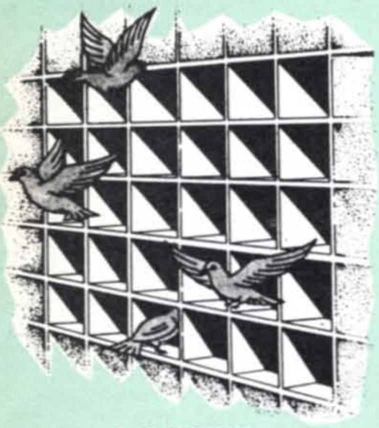
★ User defined characters are printed as you see them on the screen so that non-standard characters are automatically printed out correctly.

★ Commands select the options for the following printers:
GP100, STAR, NEC, MX/FX, KAGA, LP/VII/DMP100, DMP200.
Operates with either parallel or serial interfaces.

★ Supplied with a 50 page manual that is very comprehensive and easy to follow. Please specify printer type when ordering so that we can send the correct function key strip.

Price: £24

TWO DATABASE MANAGEMENT SYSTEMS



DISCDATA

Discdata is an entirely disc based database handling system. It is extremely easy to use through its comprehensive menu system. The simplicity is such that we do not feel the need to provide explanation on use in the written guidance supplied with the program. The first-time database user will rapidly become familiar with this package designed throughout to be simple and obvious.

Despite the ease of use this system provides all the facilities needed for complex data handling problems. The length of database that can be handled is only limited by the total space on the disc. You can have up to 20 fields with page length records up to 254 bytes in length. Adding and deleting records, amend titles, field names and records. Sort on any field and search for any record or group of records in any field. The database may be re-formatted after creation, the system will re-write all your files for you automatically. You may add extra fields and extend the length of existing fields freely.

Output formatting is very powerful. You are allowed 40, 80 or 132 column output modes going to printer or screen. Selected fields can be put in any order on the screen or printer, either across the paper or down. Output can start or stop anywhere in the file. Decimal fields are automatically totalled and records output are counted. Version 2, now on sale has improved input and amendments procedures giving full record edit as well as the 3 extra features . . . String searching, Calculations on numeric fields, and the ability to create sub files from your main files.

On disc at **Only £17**

(Please specify 40 or 80 track when ordering)

FILE-PLUS

The File-Plus package is even more powerful and flexible than Disc-Data. It is also largely menu driven but has its own command language for file searching. The 16K ROM contains all the normally required routines, with lesser used options supplied on the utilities disc. All input and output formatting is controlled through screen forms. A full screen editing system is used to define a form which allows tremendous flexibility in the format in which your data is displayed. It is very easy to change from form to form so that you can type in your data with one form, and examine it with others. You will typically design several forms before starting to access the database so that you can quickly and easily see the fields of each record that you want to appear in the layout you decide on. The form system is also used for output to your printer.

File Plus has a unique file linking system that allows the entire on-line storage of your system to be used for one database. This can give around 1.5 Megabyte databases using dual drives and double density.

The built in FQL (File-Plus Query Language) can be used for searching the database. Presented in the form of a powerful command language with looping facilities etc. this allows the most flexible access to your data possible. Full arithmetic operations are provided to allow the system to be used for statistical analysis.

Cont.

Operations supported are –, +, *, /, +–999999 9999.9999 and compare facilities =, >,<>>=, >=, <, &,.

Many keywords are supported by the language: assign, compare, display, and, goto, iff, ift, print, read, search, spool and update.

Supplied with a very detailed 70 page manual to explain all the facilities with many examples.

Only £43

(Please specify 40 or 80 tracks for the utilities disc)

DATAGEM

Gemini's 24K ROM based DATABASE Management System

Special Offer: **£110**

PEN PAL–VERSATILE LIGHT PEN SOFTWARE

Do you have a light pen that never gets used? Then this piece of software is for you. This package offers many useful facilities that make the light pen a useful device to own. Facilities included are:

- Pixel, Line and Character definition
- Free hand drawing
- All Colours
- Fill, Refill and stripes
- User defined "Brush strokes" plus character definer
- Grid, Scale and perspective aids 2 to 200 points palletable in one design with Circles and "rubber banding"
- Move design/character to any screen position
- Save and Load screens, User defined characters and line drawings for video titles, own programmes etc.

This program has many uses in education and at home. It is supplied with a comprehensive instruction manual.

Works with Watford, RH, Acorn User, DIY and many other Light Pens.

Prices

TAPE .... **£11**; DISC **£12**

LIGHT PEN

This Light Pen for the BBC micro is packaged in a neat pen shape with built in switch. Supplied complete with our sophisticated Pen-Pal software on cassette (see eleswhere in this ad).

Only **£20**

(For software on disc please add £2)

DISC EXECUTOR

Disc Executor is a sophisticated disc utility for the transfer of your cassette programs to disc. If you have difficulties transferring your cassette software to your disc system then this is the answer. It handles 'locked' files and full length adventures (up to &&e blocks) and programs that load below &E00. It is very simple to operate with instructions supplied. It saves you time and money.

Price **£10**

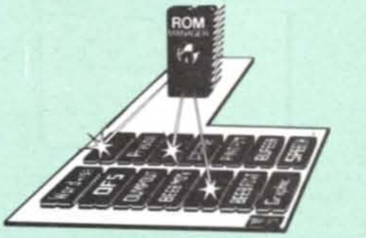
(Please specify 40 or 80 track discs)

ADE

'Systems' complete program development package in a 16K ROM. Full assembling and debugging facilities provided.

SPECIAL OFFER ONLY **£43**

ROM MANAGER



'Provides comprehensive management of all your installed ROMs – BEEBUG Nov. '84'.

This ROM is unique in its capabilities. It allows you, the user, full control over the BBC Micro's sideways ROM paging system with simple to use commands. This ROM is essential for those with several ROMs. At a simple level ROM MANAGER can be used to remove the problem of clashing command names and allow full use of all the facilities of your ROMs. This is coupled with facilities to completely enable or disable various ROMs in the machine including ROM manager itself.

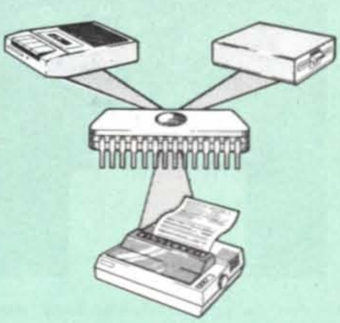
ROM MANAGER can also be used to develop sideways ROMs using the machine's standard memory. This is achieved by sending sideways ROM calls to your code in RAM, saving the expense of fitting sideways RAM for ROM development purposes. ROM status reports are also given by the ROM, including ROM lengths, checksums, entry points supported and current filing system title.

The ROM also provides facilities to examine ROMs, list function keys for editing, modify RAM (using a HEX/ASCII editor) and list ROM titles neatly and concisely.

All selection between particular ROMs is by the name of the ROM and this may be abbreviated for convenience. ROM numbers can also be used if required. This ROM is very simple and obvious to use. All the facilities are explained in the clear and detailed manual.

Price **£22**

BUFFER & BACKUP ROM



For those with sideways RAM fitted in their machines this utility ROM will make full use of this facility. By using the sideways RAM area for extra memory the following features are implemented:

- ★ 4K or 16K buffer for parallel printer.
- ★ Dumps selection of Disc files to Tape.
- ★ Makes backup copies of tapes on to tape and disc.
- ★ Displays contents of paged ROMs on screen.
- ★ Menu display of ROM filing system contents on Shift-Break.
- ★ Comprehensive manual.

Only £22

Continued →

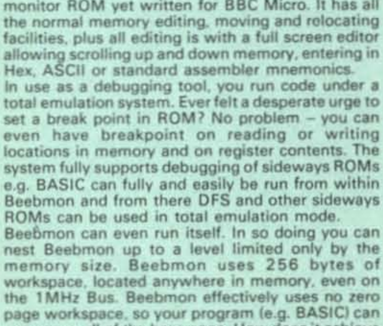
BEEB MON

INX
CMP
YI
JSR

Watford's own Machine code Monitor ROM written by Andrew Bray (Cambridge), co-author of the BBC Micro Advance User Guide.

The most powerful and versatile machine code monitor ROM yet written for BBC Micro. It has all the normal memory editing, moving and relocating facilities, plus all editing is with a full screen editor allowing scrolling up and down memory, entering in Hex, ASCII or standard assembler mnemonics.
In use as a debugging tool, you run code under a total emulation system. Ever felt a desperate urge to set a break point in ROM? No problem – you can even have breakpoint on reading or writing locations in memory and on register contents. The system fully supports debugging of sideways ROMs e.g. BASIC can fully and easily be run from within Beebmon and from there DFS and other sideways ROMs can be used in total emulation mode.
Beebmon can even run itself. In so doing you can nest Beebmon up to a level limited only by the memory size. Beebmon uses 256 bytes of workspace, located anywhere in memory, even on the 1MHz Bus. Beebmon effectively uses no zero page workspace, so your program (e.g. BASIC) can use any or all of the base page. How does it achieve this? By providing a 6502 interpreter all programs running under it exist in a vertual BBC, so special memory locations like the ROM latch are not actually accessed by your programs, instead they alter a location in Beebmon's workspace. Emulation also allows immediate return to Beebmon command level by ctrl-escape no matter what code is being executed at the time. All this exceptional power and flexibility is complemented by a clear and detailed manual included in a value for money price of:

£22

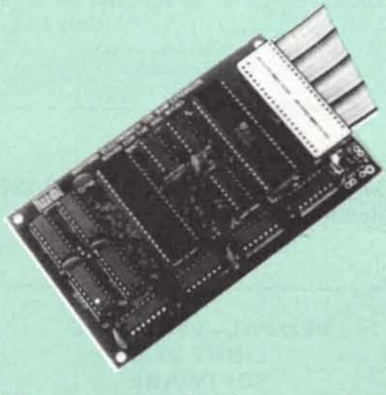


Discover the hidden secrets of BASIC and the OPERATING SYSTEM with this easy to use progammers tool.
A ROM based machine code Disassembler for the BBC micro. It enables machine code programs to be listed in BASIC/DUMP format and thus is the perfect complement to the built in assembler. It allows Sideways ROMs, files on disk or tape to be listed, and also has a comprehensive editor, allowing mnemonics to be altered directly, as well as HEX, DECIMAL ASCII and BINARY memory editing. There is also a full set of labelling facilities available (up to 3,200 labels), with the major locations and routines already labelled.
Thus DIS-ASM enables any monitor program, such as BEEBMON to be used to much greater effect as it is not necessary to disassemble memory each time the display is altered.

ONLY **£18**

32K RAM

EXPANSION BOARD



Now Watford Electronics brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. It simply plugs into your micro's 6502 processor socket. (No soldering required). This compact board which fits inside the computer doesn't just give you 16k or even 30k of extra RAM, but a massive **32K !!!**
There are many more useful facilities available with this board:

- The top 20K of the expansion RAM can be used as the screen display memory, leaving all the standard BBC RAM free for programs or data storage. This allows good graphics and long programs to be combined. For instance you could have MODE 0/1/2 GRAPHICS AND 28K OF PROGRAM SPACE. The extra memory can be used by virtually any language or utility such as BASIC, VIEW, WORDWISE, etc.

- The FULL 32K or the bottom 12K of the expansion RAM can be used as a PRINTER BUFFER for SERIAL or PARALLEL printers, sound channels, RS423, Keyboard or Speech Synthesiser. This allows very long text files to be printed while you are using 28K of program and 20K of graphics! THE BUFFER IS UNIQUE because it replaces one of the BBC Micro's buffers so all the buffer options are available on it. e.g. *FX15,21,138, 145, ADVAL (–no.) etc.

- This board is the ideal complement to any word processing system, disc or cassette based. There is no need to wait for slow printers as you can type in long text in 80 column display mode while printing is going on – TWO JOBS DONE SIMULTANEOUSLY!!! (an equivalent printer buffer would cost you £120 +)

- Unlike our competitors, the board is compatible with a vast range of software and hardware available for the BBC microcomputer, including our ROM expansion board, double density DFS Units and the ATPL ROM extension board. This is because our board is connected to the computer by means of a ribbon cable without soldering. It can be either be left in the micro or stuck to the lid with the 4 self adhesive feet supplied.

- The board comes with a comprehensive manual and ROM based software with a large range of commands for machine code and BASIC users, including many *HELP messages.

Only: £65

GRAPH PAD

With this popular British Micro's Graph-pad, you can add new dimensions to your computer enjoyment. It helps you to create your own application programs by the simple use of the Graphpad. Ideal for Educational use. Supplied complete with Cables, Manual and a two program cassette.

SPECIAL OFFER **£86**

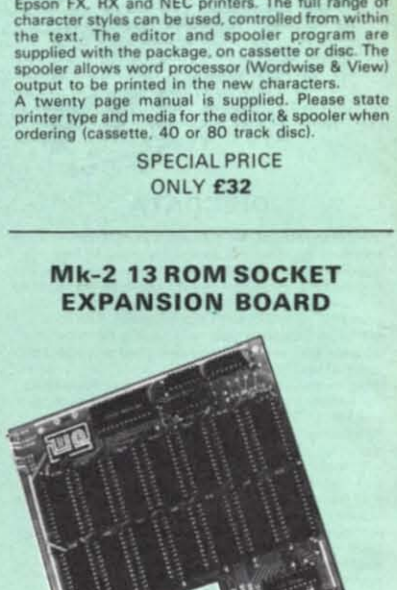
BEEBFONT ROM

BEEBFONT is a remarkable and different concept in BBC software supplied on a 16K ROM. It allows you to display text on the screen in 13 different styles:

It works in modes 0, 1, 2 and 4 using the full colour capabilities of each mode. Characters are printed in the same way as normal. Selection between the various fonts is very easily achieved with Ctrl-V – press this followed by a font number and the output will continue in the new font. Beebfont ROM is particularly useful in display work with the characters produced at twice the normal size.
You can create your own character fonts with the editor supplied. You can also print-out pre-formatted text files using the special characters with Epson FX, RX and NEC printers. The full range of character styles can be used, controlled from within the text. The editor and spooler program are supplied with the package, on cassette or disc. The spooler allows word processor (Wordwise & View) output to be printed in the new characters.
A twenty page manual is supplied. Please state printer type and media for the editor & spooler when ordering (cassette, 40 or 80 track disc).

SPECIAL PRICE
ONLY **£32**

Mk-2 13 ROM SOCKET EXPANSION BOARD



Now all lines fully buffered – On board battery back-up facility – will now accept EPROMS 2716, 2732, 2764 & 27128 and ROMs 6116 & 6264.
Simply plugs into one of the four ROM sockets currently available in BBC Micro. There are only 5 solder connections to be made. Full instructions are supplied. Unlike other ROM Boards, this board has been ergonomically designed to enable the user, easy further expansion inside the Micro, e.g. Double Density Board, Torch Board, RAM Card, etc., without any clash. (At Watford, we think ahead).
Our Mk2 13 ROM Socket Board enables the User to increase the sideways ROM capacity from the basic 4 sockets upto full 16 capable of being supported by current operating systems. In addition the board is designed with the facility to hold upto 16K RAM, which when switched into operation is automatically selected by any WRITE signal to the Sideways ROM area. This gives the User the ability to write a utility or language and upon pressing break have the utility or language up and running (new ROM software can be developed and tested in situ.)

The Board gives the User, plenty of freedom to explore the possibilities of the new paged ROMs due in the coming months and offers them the chance to develop their own.

All lines are fully buffered and the board meets or exceeds all timings for operation in the BBC Microcomputer. When fully populated, the ROM Board consumes less than half the recommended maximum current limit.

Supplied ready-built and tested complete with fitting instructions.

SPECIAL OFFER: £28 (carr. £1)

COMPUTER CONCEPT'S ROMS

CARETAKER Basic Utility	£28
Graphics ROM	£28
Disc Doctor ROM	£28
TERMI	£27
COMMUNICATOR	£58

Wordwise

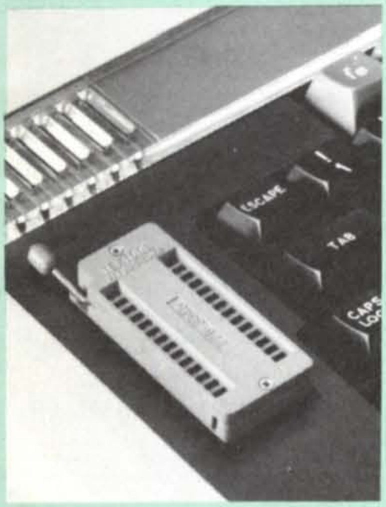
Without doubt a very sophisticated piece of software for the BBC Micro. It has all the features of a professional word processor yet is easy to use.

SPECIAL OFFER THIS MONTH:	£32

WORDWISE PLUS

Now available from stock	£49

SIDEWAYS ZIF SOCKET



Now Watford Electronics brings you a ROM board for small budgets or for those of you who do not wish to open up your Micro frequently. It allows you to change ROMs quickly and efficiently with the minimum of effort – no screws to loosen or keyboard to remove. The unit consists mainly of a zero insertion force (ZIF) socket on a small circuit board which is located into the position of the 'ROM Cartridge' and is connected to one of the internal ROM sockets via a ribbon cable.

- Very simple to install. NO SOLDERING REQUIRED. The ZIF eliminates the possibility of damage to your ROM pins when inserting and extracting them.

- The low profile of the socket allows unrestricted access to the keyboard, unlike other cartridge systems. In addition, there are no costly extras, such as ROM cartridges for every new ROM.

- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.

- This versatile hardware solves the problem of running out of socket space, simply unplug the ROM and plug in a different one. It is a real must for Professionals and Hobbyists alike.

ONLY **£16** (£1 carr.)

The UNICOM Modem

Are you thinking of purchasing a low cost high performance modem, but finding yourself confused by the features offered and the different prices? Well now the answer is here, in the form of The UNICOM Modem!

This fabulous modem offers the packed with all the features most Users will ever want (plus many more!) The software includes some of the most powerful, flexible and easy to use modem software ever written for a micro.

Price:

UNICOM MODEM	£49.95
UNICOM ROM Software	£20.00
UNICOM disc Software	£10.00

(Carriage £2.50)

APPROVED for use with telecommunication systems run by British Telecommunications in accordance with the conditions in the instructions for use.

MODEM 84

PRESTEL TERMINAL

For the BBC Microcomputer

COMMUNICATION
WATFORD ELECTRONICS GIVES YOU "THE KEY TO WORLD COMMUNICATION"

The Watford Prestel package consists of the B.T. approved Watford MODEM 84 (1200/75 baud full duplex 1200 baud half duplex direct connect) and a very sophisticated Prestel Terminal ROM. Please write-in for full technical literature.

PRICES

MODEM 84 (with Lead & Manual)	£68
MODEM 84 complete with PRESTEL SOFTWARE ROM, Lead and manuals	£82
PRESTEL SOFTWARE ROM +Manual	£20
USER to USER 1200 BAUD SOFTWARE ROM	£18

(At these incredibly low prices for such a sophisticated BT Approved Prestel Terminal, Modem 84 has to be the best buy around)

(Carriage on Modem £2)

Nightingale Modem

Now Watford brings you PACE's NIGHTINGALE MODEM PACKAGE including the popular Commstar ROM software for the BBC Micro. Nightingale is considered to be by far the most versatile BT approved modem available at the price for the BBC Micro. It is ideal for home or business use. It offers Prestel/Viewdata baud rates (1200/75 & 75/1200) as well as 300/300 baud full duplex for communication between BBC and other computers, including bulletin boards. A bargain at our

SPECIAL INTRODUCTORY OFFER

(Price includes COMMSTAR ROM & comprehensive manuals) **£119**

NEW LAUNCH

16K DISC RAM

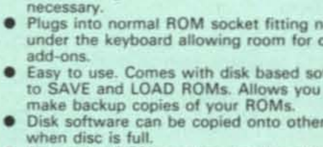
This is the RAM you've been waiting for!! This battery backed up, write protectable 16K sideways RAM board allows you to run from disk every sideways ROM available. Beware of other sideways RAM boards which are not backed up as certain ROMs will not run in these boards even though the RAM can be write protected. The Battery Backup facility allows retention of DATA after power off. On switch on the Micro will think the WATFORD DISC RAM is a ROM. Features available are:

- No soldering or modifications to BBC micro necessary.
- Plugs into normal ROM socket fitting neatly under the keyboard allowing room for other add-ons.
- Easy to use. Comes with disk based software to SAVE and LOAD ROMs. Allows you to make backup copies of your ROMs.
- Disk software can be copied onto other discs when disc is full.
- All existing ROMs can be stored on disk and used in DISC RAM.
- No messy plugging and unplugging of your ROMs. Simply Load the one you want into DISC RAM.
- Ideal for Professional users to develop ROMs. Backup facility allows testing of final versions without using EPROMs.
- The switch provided allows backup and write protection to be switched off externally.
- Can also be used as 16K printer buffer RAM.

Only: **£39**

P.S. 16K DISC RAM Board is not designed to work in conjunction with a Sideways ROM Board.

Versatile BEEB SPEECH SYNTHESISER Unit



SIMPLY the best! – An unlimited speech synthesis system. Complete with easy-to-follow manual. Controlling software is in ROM so no Cassette Loading problems!

PHONEMES for word synthesis – That means unlimited vocabulary! No extra speech dictionary chips to buy!

BUILT-in Library of approximately 500 words to get you started.

ENGLISH accent – Utilises inflexion techniques to produce highly comprehensible speech.

EASY to use system – Just plug the software ROM into a socket, the Speech unit into the User Port, and away you go! No specialised 'dealer upgrade' required!

COMPACT unit – The whole system is built into a small case – easily tucked behind the computer. Auxillary output socket provided for direct connection to an external amplifier.

HOURS of fun! – Suitable for any application – Games, Educational Programs, Specialised Packages.

We know this all seems to good to be true but DON'T BE LEFT SPEECHLESS! Order your Versatile Speech Unit now!

SPECIAL OFFER £35

Continued →

BOOKS (No VAT on Books)

30 Hour BASIC (BBC Micro)	£6.95
35 Education Programs for BBC	£6.95
36 Challenging Games for BBC	£5.95
40 Educational Programs for BBC	£5.95
100 Programs for BBC Micro	£6.95
Cassette version of above	£10.00
6502 Application Book	£11.95
6502 Assembly Language Program	£13.95
6502 Assembly Language Subroutines	£14.25
6502 Machine Code for Beginners	£5.95
6502 Machine code for Humans	£7.95
6502 Software Design	£10.50
A young persons guide to BBC Basic	£4.50
A beginners guide to LISP	£10.95
Advanced Machine Code Technique for BBC	£7.95
Advanced User Guide for BBC Micro	£11.95
Advanced Graphics with BBC	£9.95
Advanced 6502 Programming	£12.45
Assembly Language Programming on BBC Micro	£7.95
Advanced Programming Techniques for the BBC Micro	£7.95
BBC Basic	£7.95
BBC BASIC	£5.95
BBC Computer Magic	£5.50
BBC DIY Robotics & Sensors	£6.95
BBC Forth	£7.50
BBC Lisp	£7.50
BBC Micro An Expert Guide	£6.95
BBC Micro Book BASIC Sound & Graphics	£7.95
BBC Micro Graphics and Sound	£6.95
BBC Micro Programs in Basic	£5.95
BBC Micro **ROM PAGING** System Explained	£2.00
BBC Micro Revealed	£6.95
BBC Micro Assembly Lang. Prog.	£7.95
BBC Micro Disc Companion	£7.95
BBC Micro in Education	£6.50
Basic Programming on BBC Micro	£5.95
CP/M The software BUS	£8.95
CP/M Users Guide	£13.95
Creating Adventure Programs on BBC Micros	£6.95
Creative Graphics Cassette (Acornsoft). Has 36 graphics programs	£8.95
Creative graphics on BBC Micro	£7.50
Complete Programmer for BBC	£5.95
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
Discover BBC Machine Code	£6.95
Discover FORTH	£13.95
DIY Robotics & Sensors with BBC	£6.95
Exploring FORTH	£6.95
Further Prog. for BBC Micro	£5.95
Forth Programming	£14.40
Functional Forth for the BBC Micro	£5.95
Games BBC Computer Can Play	£6.95
Getting more from your BBC & Electron	£6.95
Graphs & Charts on BBC Micro	£7.50
Graphic Art for BBC Computer	£5.95
Graphs and Charts (Cassette)	£7.50
Introducing the BBC Micro	£5.95
Introduction to FORTH	£9.30
Interfacing projects for the BBC Micro	£6.95
Introducing LOGO	£5.95
Let your BBC teach u to program	£6.45
LISP	£9.25
Logo Programming	£8.95
Mysteries of DISC DRIVES and DFS REVEALED	**£5.95**
Mastering CP/M	£13.65
Programming the 6502	£11.95
Programming the Z80	£14.25
PASCAL	£9.25
Structured Prog. with BBC BASIC	£6.50
The Complete FORTH	£6.95
The Epson FX/KAGA PRINTER Commands REVEALED	**£5.95**
Using Floppy Discs with BBC Micro	£5.95
Using BBC Basic	£6.95
Wordstar & CP/M made easy	£6.95

Watford brings you

THE AMX MOUSE

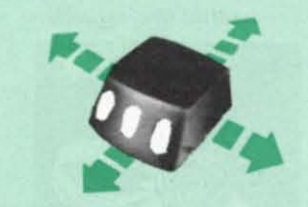
'The program is simplicity itself and the user manual is virtually redundant' . . . Micro User Jan. 85.

Bring into your home or office the last word in user friendly input devices for the Beeb. The AMX MOUSE that won the hearts and the minds of thousands of visitors at the Show has arrived at Watford Electronics at a very special price!

Using simple Icons, and small movements of the mouse on a work surface, you can select any one of the functions from the pull down menus. The mouse will operate from within Wordwise, View and many other software packages. The three buttons built in to the mouse are user programmable for many extra functions.

The package consists of the mouse, the advanced controlling software in ROM and a disc containing the Icon designer and the AMS ART software (see diagrams).

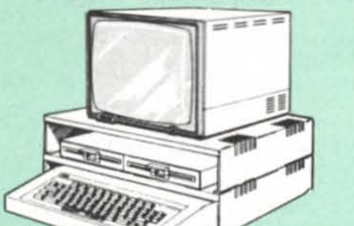
To summarise this superb product a comment passed by a very senior authority on BBC micro at the last Micro User Show was, 'My only criticism of the product is that, IT'S TOO CHEAP!'



OUR SPECIAL INTRODUCTORY OFFER PRICE

ONLY: £68.50

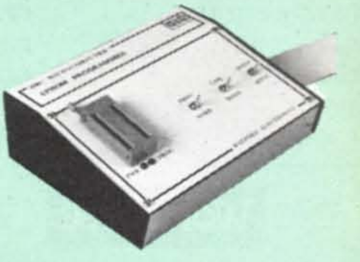
PLINTHS FOR BBC MICRO AND PRINTERS



Protect your computer from the weight and heat of your monitor. The BBC micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and monitor, whilst the double height version provides enough room for our stacked or side-by-side dual disc drives or TORCH Disc pack, to be placed in the centre section. If you use our stacked drives, the remaining space can be used for further peripherals e.g. Speech Synthesizer, EPROM programmer or simply stationery. The computer slides neatly in to the lower section allowing easy access to remove the lid. The printer plinth is equally sturdy but without the cooling slots. It allows for access to the paper from the front as well as from the rear, (a facility not often thought of in similar products) if the paper is located beneath the plinth. This is a very convenient way to work especially if your work area is not deep enough to take the printer and paper separately.

SINGLE BBC PLINTH	**£11** (carr. £1.50)
DOUBLE BBC PLINTH	**£20** (carr. £2.00)
PRINTER PLINTH	**£10** (carr. £1.50)

EPROM PROGRAMMER



The Watford Electronics' EPROM programmer for the BBC micro is a high quality self contained package. Programs all popular EPROMs from 2K to 16K: 2716, 2516, 2532, 2564, 2764 and 27128. All manufacturers' specifications have been followed to program EPROMs at the correct speed – wrong timings could destroy your EPROMs. The unit has its own power supply so does not put heavy loads on the BBC power supply as do some other units. Connects directly to the 1MHz bus following all Acorn recommendations on addressing and bus loadings.

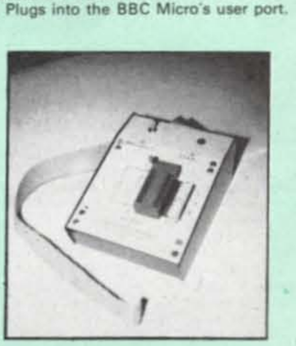
SOFTWARE PACKAGE
The software is supplied on an EPROM which plugs into the Micro and is instantly available with a single command (no time wasting as on Cassette/disc loading). It is a fully purpose designed and ingegrated package to simplify ROM development. The system is menu driven with many prompts to avoid any accidents.

Software facilities include:
Load File – Save File – Down Load EPROM – Program EPROM – Verify – Blank Check – Editing of memory contents prior to programming.
Also included is an automatic system to allow Basic programs to be put in EPROM and accessed through the *ROM filing system. More than one program may be put in an EPROM. All these facilities and more are explained in the comprehensive and clear 15 page manual.

SPECIAL OFFER £69
(£3 carr.)

LOW COST 'DIN' EPROM PROGRAMMER

A high performance, low cost, self contained 'DIN' EPROM PROGRAMMER for the BBC Micro. Plugs into the BBC Micro's user port.

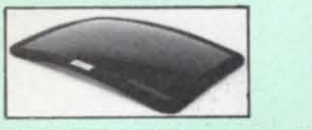


The features are:

- Will program 2716, 2732, 2532, 2764 & 27128 EPROMs.
- Copy Eprom into memory and compute checksum.
- Blank check EPROM.
- Program EPROM from memory.
- Verify programmed EPROM and display checksum.
- All * commands may be used from menu mode.
- High speed programming on 2764 & 27128.
- Machine code SOFTWARE supplied in ROM.

Price Only: **£49.50**

ANTI GLARE MONITOR SAFETY SCREEN



HEADACHES? TIRED EYES? Don't take pills – Use a Watford Electronics anti-glare filter!

- Made in Britain by a long established glass maker.

Available in 12" & 14" versions – please specify the exact monitor type when ordering.

Special Price: **£15.00** (carr. £1)

SURGE PROTECTOR Plug

Fitted in place of your normal mains plug, this device protects your equipment against mains surges. Nearby lightning strikes, thermostats switching and many other sources put high voltage transient spikes on to the mains. This can lead to data corruption in memory and on disc and can result in spuriously crashing machines. Suitable for computers, Hi-Fi, Fridge Freezers etc. Max Surge current 2KAmp; max. Voltage 250. Essential for serious computer users.

Protection for only **£8.50**

FLEXIBLE KEYBOARD CONNECTOR

A 'Keyboard to Micro' replacement jumper lead.

ONLY: £4.95

ATTACHE CARRYING CASE for BBC Micro

The Attache carrying case is attractively finished in mottled antique brown leatherette. The case is made of tough plywood, providing a very solid and safe way to carry your BBC micro. There is room provided to fit all the leads necessary behind the computer and manuals in the front. Locks supplied with two keys. Price **£12** (£2 carr.)

DATA RECORDER AND ACCESSORIES

Top quality slimline portable cassette recorder designed specifically for use with home computers. Mains/Battery operated with tape counter. **£20**

DATA CABLE to connect recorder to BBC **£2.50**

DATA CASSETTES

Top grade tested C12 Data cassettes supplied in library cases **35p** each; 10 for **£3.20.**

ASSORTED CONNECTING LEADS

(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug	
to 5 pin DIN Plug + 1 Jack Plug	**£2.00**
to 3 pin DIN Plug + 1 Jack Plug	**£2.00**
to 7 pin DIN Plug	**£2.50**
to 3 Jack Plugs	**£2.00**
6 pin DIN to 6 pin DIN Plug (RGB)	**£2.50**

MONITOR LEADS

Microvitec RGB leads 6 pin DIN to 6 pin DIN for colour monitors.	**£2.50**
KAGA/SANYO Colour Monitor Leads	**£5.00**
Monochrome monitor leads BMC to Phono	**£3.00**

DISC DRIVE POWER LEADS

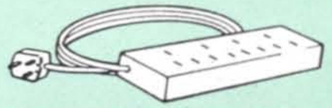
Supply from BBC power supply to standard Disc Drive connector.

Single **£3.00** Dual **£3.75**

MISCELLANEOUS CONNECTORS

	Plugs	Sockets
RGB (6 PIN DIN)	30p	45p
RS423 (5 pin Domino)	40p	50p
Cassette (7 pin DIN)	25p	65p
ECONET (5 pin DIN)	20p	30p
Paddles (15 pin 'D')	110p	215p
BBC Power Plug 6 way	80p	–
Disc Drive Plug 4 way	75p	–

4 WAY MAINS DISTRIBUTION SOCKET



4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals. Allows the whole system to be switched on from one plug.

£9.50

THE INVESTIGATOR

This sophisticated Utility program on disc, enables you to make security back-up copies of all your valuable Disc Software. Makes full use of all 8271 facilities to discover the precise format of your protected disc so that an exact copy can be produced. Supplied with detailed instructions. Please specify 40 or 80 track disc when ordering.

Special Offer this month

Only **£20**

CHIP EXTRACTION TOOL

This extremely useful tool allows trouble-free IC removal from your computer. No longer do you have to weald a screwdriver at your valuable ROM software, instead this IC extractor distributes the removal force over the whole body of any 24 or 28 pin device, thus preventing undue damage to your chips. Isn't £1.50 a small price to pay to protect your ROMs stature?

Price: Only £1.50

ADVENTURE GAMES (level 9)

COLOSSAL ADVENTURE	**£8.50**
ADVENTURE QUEST	**£8.50**
DUNGEON ADVENTURE	**£8.50**
SNOWBALL ADVENTURE	**£8.50**
LORDS OF TIME	**£8.50**

Please add £2.50 for Discs

MISCELLANEOUS

28 pin ZIF SOCKET (Textool) **£6.95**

28pin DIL PLUG

SOLDER type	**£2.90**
IDC CRIMP type	**£3**

RIBBON CABLE

28way **55p/ft;** 34way **60p/ft.**

8way DIP SWITCH **£0.85**

CHIP SHOP

7438	**75p;**	74LS00	**30p**
74LS04	**35p;**	74LS10	**30p**
74LS123	**120p;**	74LS163	**85p**
74LS244	**£1;**	74LS245	**£2**
74LS393	**120p;**	4013	**60p**
4020	**£0.90**	4816	**£2.00**
LM324	**£0.75**	UPD7002	**£7.25**
6502A CPU	**£5.45**	65C02A CPU	**£9.50**
6522	**£3.40**	6845S	**£7.50**
SAA5050	**£8.75**	SN76489	**£5.50**
2764-250nS	**£4.25**	27128-250nS	**£9.75**
6116LP-2K	**£3.25**	6264LP-8K	**£9.95**
8271	**£55**	ACORN DNFS	**£15**
ACORN OS 1.2	**£10**	ACORN BASIC 2	**£30**

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28**
- **ERASER GT** – Deluxe version erases up to 28 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30**
- Spare UV tubes. **£9**

VOLTMACE DELTA 14 JOYSTICK SYSTEM

The Voltmace system provides full facilities for connecting the Delta 14 handset.

Delta 14 handset – On its own makes a high quality centre sprung analogue joystick with fire buttons **£12.50**

Adaptor Module allows use of two joysticks and provides hardware to access all the keys on the keypad of the joystick **£12.55**

Transfer program allows use of the keypad keys and joystick to simulate any key on the keyboard. This works by creating a machine code patch that stays in memory while another program is loaded in. Allows any game to be used with joysticks. Supplied on disc or tape.

Tape **£5.10** Disc **£7.95**

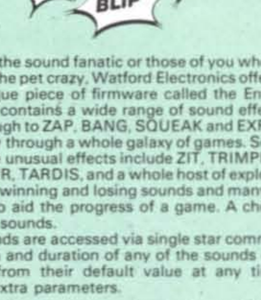
STANDARD JOYSTICKS

These are standard analogue type with a fire button on each joystick. Twin joysticks go to a single moulded plug, long leads provided.

Single Player version **£9.75**

Two Players version **£15.00**

SOUND EFFECT (ENVELOPE) ROM



Now for the sound fanatic or those of you who want to drive the pet crazy, Watford Electronics offers you this unique piece of firmware called the Envelope ROM. It contains a wide range of sound effects, in fact enough to ZAP, BANG, SQUEAK and EXPLODE your way through a whole galaxy of games. Some of the more unusual effects include ZIT, TRIMPHONE, SNAPPER, TARDIS, and a whole host of explosions, gun fire, winning and losing sounds and many other effects to aid the progress of a game. A choice of over 65 sounds.

The sounds are accessed via single star commands, the pitch and duration of any of the sounds can be altered from their default value at any time by adding extra parameters.

A must for all the games designers. Supplied complete with instructions.

ONLY £18

Prices subject to change without notice and available on request.

MAIL ORDER AND RETAIL SHOP. TRADE AND EXPORT INQUIRIES WELCOME. GOVERNMENT AND EDUCATIONAL ESTABLISHMENTS OFFICIAL ORDERS ACCEPTED.

CARRIAGE: Unless stated otherwise, please add £1 to all cash orders.

VAT: UK customers please add 15% VAT to the total cost incl. Carriage.

SHOP HOURS: 9.00am to 6.00pm. Monday to Saturday. (Ample Free Car Parking Spaces)

ACCESS ORDERS: Simply phone: Watford (0923) 50234. (24 Hours)

Watford Electronics

Dept. BBC, 250 High Street, WATFORD, ENGLAND
Tel: Watford (0923) 40588/37774 Telex: 8956095 WAELEC

Herbie Briggs has just destroyed the myth that all floppy discs are created equal.

They seem equal. Until you look at the seams.

That's where equality ends.

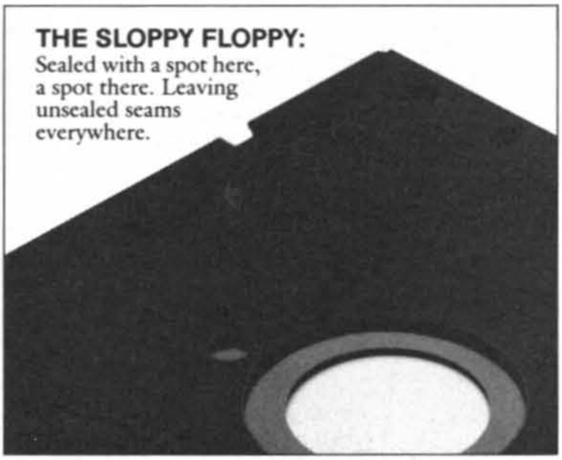
Most companies seal their discs with a spot here, a spot there. Leaving most of each seam not sealed at all.

Sooner or later, the seams might do what comes naturally: they bulge. Warp. Pucker. Open up.

Pens, pencils, fingernails—even a four-year-old's, like Herbie—can catch and snag in those wide open spaces.

That's sloppy. And dangerous. Because if you put a sloppy floppy into your disc drive, it can jam your drive. Ruin your drive head. Lose your data.

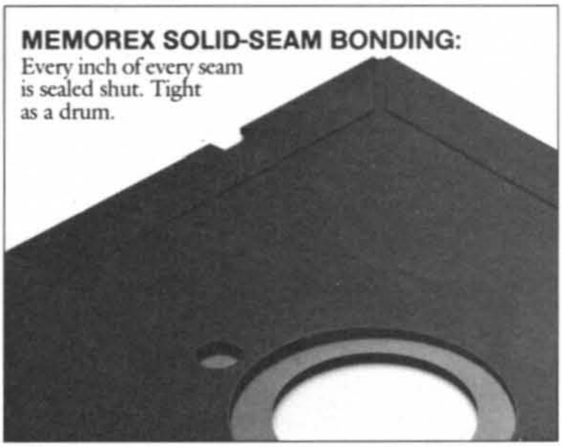
So much for their seams. Ours are different.


THE SLOPPY FLOPPY:
Sealed with a spot here, a spot there. Leaving unsealed seams everywhere.

Memorex uses a process we developed, called Solid-Seam Bonding.

Solid-Seam Bonding seals shut every inch of every seam of every Memorex® floppy disc. Tight as a drum. That makes the Memorex floppy stiffer. Stronger. And your data safer.

To resist bulging, warping, puckering, or opening up.


MEMOREX SOLID-SEAM BONDING:
Every inch of every seam is sealed shut. Tight as a drum.

To resist all the things that can jam your drive, ruin your drive head, or lose your data.

Which proves that a Memorex floppy disc isn't equal to all the others. It's better.

Solid-Seam Bonding is just one example of the extra care that goes into every Memorex floppy disc. Be it 8," 5¼" or the new 3½." Extra care that lets us guarantee every Memorex disc to be 100% error-free.

The next time you're buying a floppy disc—or a few hundred of them—just remember this:

It's always better to be safe than sloppy.

For more information on the full line of Memorex quality computer media products, including computer tape, call Memorex U.K. Ltd.,
96-104 Church Street,
Staines, Middlesex.
Tel: 0784 51488

MEMOREX
MEMOREX
MEMOREX

Your Data. When it matters, make it Memorex.™

MEMOREX

Memorex is a registered trademark of Memorex Corporation.
©1984 Memorex Corporation
A Burroughs Company

THERE was a very powerful disc utility program called Deditor in the August 1984 Micro User which, among other things, allowed you to recover accidentally deleted files or manipulate files on disc very easily.

However one of the things you had to do to restore a file was to find where it was on the disc.

This process is greatly facilitated if you make a habit of having a descriptive REM statement as the first line of your program. But even then you might end up looking through an entire disc for a file which could be anywhere.

This is not only frustrating but laborious and you might miss the program altogether. So why not get a program to do the job for you?

This utility does just that, and since it is 100 per cent machine code it'll do it faster than you could ever manage it. In fact the program can scan at a rate of approximately one track a second.

Type it in exactly as shown and save it before you run it. This is vital because if you run it at the default address – that is &1900 – it will be overwritten by the machine code it generates.

Also if you have made any mistakes you are likely to be faced by an inescapable crash. Once you've typed it in and saved you can chain it with PAGE at &2700. This is done by typing

PAGE=&2700:CHAIN "filename"

where *filename* is the name under which you saved the source code.

If all goes well the program will print instructions for you to save the object code. As it stands, the object code is assembled to &1900, which is also the execution address, but this may be changed if you wish. It is executed either by calling &1900 or entering *SEARCH. Then enter the string you want to search for (which can be up to 120 characters long) and the program goes off to find all occurrences of that string.

When the program locates it, it will print the track and sector in decimal and the offset in hex. The search continues until the program reaches the end of the disc but you can exit by pressing Escape, which may take a while (not more than a second) to register.

Once you have found the string you're looking for, you can load in Deditor to recover the program.

Since the program is written entirely in machine code the source code is large but the object code is unbelievably compact. The readability of the source code has been helped to a certain extent by the use of macros – lines 1340 to 1620.

IF you have 40 track discs change 80 in lines 220 and 690 to 40.

10-40	REM statements.
50	Selects Mode7.
60-80	Defines constants.
90	Start of machine code.
120	Calls a subroutine which reads in one track.
130-150	Initialise counters.
160	Increment counter.
170	Check for first character of string.
180	If they match check for rest of string.
190-200	Increment address counter.
210	Checks whether one track has been searched.
220	Checks whether all of the tracks have been read – 40 or 80.
230	If it has back to Basic.
240-250	Check the whole string.
260	If a match is found the print track, sector and offset.
270	End of subroutine.
290	Selects Mode 7.
300	Disable Escape key.
310	Prints input drive.
320	Calls subroutine which accepts a decimal number. Also checks that something has been entered.
330	Checks whether entry was smaller than four.
340	Initialises track and sector to zero.
350	Prints "Enter search string" and forces new line.
360	Calls subroutine which accepts a string and checks that a null string has not been entered.
380-390	Define text window.
400	Enables Escape key.
410-430	Initialise parameter block for OSWORD call.
440	End of subroutine.
450	Initialises counter.
460	Scans keyboard and checks if it is delete.
470	If it is, delete last character else check whether it's the Return key.
480	Checks whether it is within Ascii range.
490	Adds to string and goes back for more.
500	End of string. Notes length of string and forces new line.
510-530	Subroutines which are called from within the above string input routine.
540-610	Subroutine which is called when there is a string match. It prints the track, sector and offset.
620	Subroutine reads in one track.
630	Checks for Escape key.
640-660	Set up parameter block.
670	Points to parameter block and sets accumulator to &7F.
680	Reads in the track and checks for error.
691-730	Reads a single sector which immediately follows the track which has just been read in – in case a string overlaps two tracks.
740-770	Errors.
780-820	Print the number held in the accumulator in hexadecimal.
830-1050	Reading a decimal number and converting it in hex.
1060-1100	General subroutine which prints a string pointed to by address "string".
1110-1230	General routine to print an eight bit number in decimal.
1240-1270	Strings.
1280-1300	Reserve work space.
1310	End of machine code.
1340-1620	Pseudo operators and macros.

FIRST FIND YOUR FILE...

And SHINGO SUGIURA's elegant utility helps transform a laborious task into a pleasure

Disc Search listing

```
   10 REM Disc string search
   20 REM By Shingo Sugiura
   30 REM (c) The Micro User
   40 REM For Single density DFS'
   45 REM Or DDFS' with an 8271 emula
tor
   50 MODE7
   60 oswrch=&FFEE:osnewl=&FFE7:oswor
d=&FFF1:osrdch=&FFE0:osbyte=&FFF4
   70 number=&2A:limit=&2B:track=&2C:
sector=&2D
   80 string=&70:pointer=&72:length=&
74:buffer=&7100
   90 FOR pass=0 TO 2 STEP2:P%=&1900
  100 [OPT pass
  110 JSR init
  120 .main_loop JSR read_sec
  130 LDY#0:LDX#&FF
  140 LDA#FNlo(buffer):STApointer
  150 LDA#FNhi(buffer):STApointer+1
  160 .loop INX
  170 LDA(pointer),Y:CMPs_buffer:BNEc
ont
  180 JSRcheck:.cont
  190 INCpointer:BNEloop
  200 INCpointer+1:.no_carry
  210 LDA#FNhi(buffer+&A00):CMPpointe
r+1:BNEloop
  220 LDA#80:CMPp_block+7:BNEmain_loo
p
  230 RTS
  240 .check INY:CPYlength:BEQfound
  250 LDA(pointer),Y:CMPs_buffer,Y:BN
Enot_found
  260 BEQcheck:.found JSRstatus
  270 .not_found LDY#0:RTS
  280 .init
  290 LDA#22:JSRoswrch:LDA#7:JSRoswrc
h
  300 LDA#200:LDX#1:LDY#0:JSRosbyte
  310 OPT FNprint(ds):LDA#1:STAlimit:
.rep1
  320 OPT FNp_tab(12,0,rs):JSRdecimal
:CPX#0:BEQrep1
  330 LDAnumber:CMP#4:BCSrep1:STAp_bl
ock
  340 LDA#0:STAp_block+7:STAp_block+8
  350 OPT FNprint(is):JSRosnewl:JSRos
newl:LDA#120:STAlimit
  360 .rep4:OPT FNtab(0,3):JSRe_strin
g:CPY#0:BEQrep4
  370 OPT FNp_tab(0,7,ls)
  380 LDA#28:JSRoswrch:LDA#0:JSRoswrc
h:LDA#24:JSRoswrch
  390 LDA#39:JSRoswrch:LDA#9:JSRoswrc
h
  400 LDA#200:LDX#0:LDY#0:JSRosbyte
  410 LDA#0:STAp_block+3:STAp_block+4
:STAp_block+10
  420 LDA#3:STAp_block+5
  430 LDA#&53:STAp_block+6
  440 RTS
  450 .e_string LDY#0
  460 .in_loopy JSRosrdch:CMP#127:BNE
m_mis
  470 JSRmis_del:.m_mis CMP#13:BEQeos
t
```

→

Disc Search listing

From Page 47

```
  480 CMP#32:BCCin_loopy:CMP#127:BCSi
n_loopy
  490 JSRad_st:JMPin_loopy
  500 .eost STAs_buffer,Y:STYlength:J
SRosnewl:JMP osnewl
  510 .ad_st CPYlimit:BNEco_ad
  520 LDA#7:JMPoswrch:.co_ad STAs_buf
fer,Y:INY:JMPoswrch
  530 .mis_del CPY#0:BNEmi_nco:RTS:.m
i_nco DEY:LDA#127:JMPoswrch
  540 .status PHA:TYA:PHA:TXA:PHA:PHA
  550 LDAp_block+7:SEC:SBC#1:STAnumbe
r:JSRp_dec
  560 LDA#&86:JSRosbyte:LDA#32:.tab1:
JSRoswrch:INX:CPX#7:BNEtab1
  570 LDApointer+1:SEC:SBC#FNhi(buffe
r):STAnumber:JSRp_dec
  580 LDA#&86:JSRosbyte:LDA#32:.tab2:
JSRoswrch:INX:CPX#16:BNEtab2
  590 PLA:JSRphex
  600 JSRosnewl:PLA:TAX:PLA:TAY:PLA
  610 RTS
  620 .read_sec
  630 BIT&FF:BMIescape
  640 LDA#FNlo(buffer):STAp_block+1
  650 LDA#FNhi(buffer):STAp_block+2
  660 LDA#&2A:STAp_block+9
  670 LDX#FNlo(p_block):LDY#FNhi(p_bl
ock):LDA#&7F
  680 JSR osword:LDAp_block+10:BNEerr
or
  690 INCp_block+7:LDA#80:CMPp_block+
7:BEQlast
  691 LDA#&21:STAp_block+9
  700 LDA#FNlo(buffer+&A00):STAp_bloc
k+1
  710 LDA#FNhi(buffer+&A00):STAp_bloc
k+2
  720 LDX#FNlo(p_block):LDY#FNhi(p_bl
ock):LDA#&7F
  730 JSR osword:LDAp_block+10:BNEerr
or:.last RTS
  740 .error BRK:OPT FNequb(255)
  750 OPT FNequs("Sector error"+CHR$0
)
  760 .escape BRK:OPT FNequb(17)
  770 OPT FNequs("Escape "+CHR$0)
  780 .phex PHA:AND#&F0
  790 RORA:RORA:RORA:RORA:JSRhex
  800 PLA:AND#&F:JMPhex
  810 .hex ORA#&30:CMP#&3A:BMIout
  820 ADC#6:.out JMPoswrch
  830 .decimal JSR d_input
  840 JSRconvert:JMPosnewl
  850 .d_input LDX#0
  860 .read JSR osrdch
  870 CMP#127:BEQ delete
  880 CMP#&D:BEQ return
  890 CPX limit:BEQ read
  900 CMP#58:BCS read
  910 CMP#ASC"0":BCC read
  920 JSR oswrch
  930 SEC:SBC#ASC"0":STA input,X
  940 INX:BNE read
  950 .return STA input,X:RTS
  960 .delete CPX#0:BEQ read
  970 DEX:JSR oswrch:BNE read
  980 .convert
  990 LDA#0:STA number
 1000 LDX#0:.c_loop
 1010 LDA input,X:CMP#&D:BEQ eon
 1020 LDA number:ASLA:ASLA:CLC:ADC nu
mber
 1030 ASLA:ADC input,X:STA number
 1040 INX:BNE c_loop
 1050 .eon RTS
 1060 .p_line
 1070 LDY#0:.p_loop
 1080 LDA (string),Y:CMP#&D:BEQ no_mo
re
 1090 JSR oswrch:INY:BNE p_loop
 1100 .no_more:RTS
 1110 .p_dec LDY#0
 1120 .digit
 1130 LDA#0:LDX#8
 1140 .d_loop ASL number
 1150 ROL A:CMP#10
 1160 BCC less
 1170 SBC#10:INC number
 1180 .less DEX:BNE d_loop
 1190 ORA#&30:PHA:INY
 1200 LDA number:BNE digit
 1210 .print PLA:JSR oswrch
 1220 DEY:BNE print
 1230 RTS
 1240 .ds OPT FNequs("Input drive "+C
HR$13)
 1250 .rs OPT FNequs("  "+CHR$127+CHR
$127+CHR$13)
 1260 .is OPT FNequs("Enter search st
ring"+CHR$13)
 1270 .ls OPT FNequs("Track  Sector
Offset"+CHR$13)
 1280 .p_block OPT FNresv(13)
 1290 .s_buffer OPT FNresv(121)
 1300 .input OPT FNresv(2)
 1310 ]NEXT
 1320 PRINT"*SAVE""SEARCH""1900+";~P%
-&1900
 1330 END
 1340 DEFFNresv(byte)
 1350 P%=P%+byte:=pass
 1360 DEFFNprint(address)
 1370 [OPT pass
 1380 LDA#FNlo(address):STA string
 1390 LDA#FNhi(address):STA string+1
 1400 JSR p_line
 1410 ]=pass
 1420 DEFFNp_tab(x,y,s_adre)
 1430 [OPT pass
 1440 LDA#31:JSRoswrch
 1450 LDA#x:JSRoswrch:LDA#y:JSRoswrch
 1460 OPT FNprint(s_adre)
 1470 ]=pass
 1480 DEFFNtab(x,y)
 1490 [OPT pass
 1500 LDA#31:JSRoswrch
 1510 LDA#x:JSRoswrch:LDA#y:JSRoswrch
 1520 ]=pass
 1530 DEFFNlo(number)=number MOD 256
 1540 DEFFNhi(number)=number DIV 256
 1550 DEFFNequs(string$)
 1560 $P%=string$
 1570 P%=P%+LEN(string$)
 1580 =pass
 1590 DEFFNequb(byte)
 1600 ?P%=byte
 1610 P%=P%+1
 1620 =pass
```

This listing is included in this month's cassette tape offer. See order form on Page 189.

◀ FOR MORE AREA DEALERS SEE PAGE 19

AVON
Georges Computer Bookshop
Bristol. 0272 276602

BEDFORDSHIRE
Dormans
Dunstable. 0582 65515

BUCKINGHAMSHIRE
Soft Shop Limited
Chalfont. 0753 889010

CHANNEL ISLANDS
Gruts
Guernsey. 0481 24682

CHESHIRE
Pyramid Micros
Warrington. 0925 35713

CUMBRIA
Cumbrian Co-Op
Workington. 0900 62251

Cumbrian Co-Op
Barrow in Furness. 0229 33139

County Store
Carlisle. 0228 25292

Penrith Communications
Penrith. 0768 67146

Cumbrian Co-Op
Whitehaven. 0946 64422

DEVON
Syntax
Plymouth. 0752 28705

ESSEX
Focus Computer Systems
Grays. 0375 79717

Essex Computer Centre
Chelmsford. 0245 358702

HAMPSHIRE
Gosport Computer Centre
Gosport. 0705 587862

KENT
Dover International Computer
Centre. Dover. 0304 212433

Kent Micro Computers
Maidstone. 0622 52784

LANCASHIRE
Whiteheads Limited
Blackpool. 0253 67253

HCCS Microcomputers
Blackburn. 0254 672214

LONDON
Electrical Trading Company
London E13. 01-552 4112

Video Place
Oxford Street. 01-637 0366

KK Stationers
Edgware Road. 01-723 1436

MIDDLESEX
JKL Computers
Uxbridge. 0895 51815

NORTHERN IRELAND
Alexanders Department Store
Larne. 0574 72733

NOTTINGHAMSHIRE
Microvision
Kirby in Ashfield. 0602 750192

SCOTLAND
T.C. Farries
Dumfries. 0387 720755

STAFFORDSHIRE
Fosters
Lichfield. 05432 22341

SUFFOLK
Suffolk Computer Centre
Bury St. Edmunds. 0284 3181

S.J. Emery
Bungay. 0986 2141

SUSSEX
Business Computer Consultancy
Chichester. 0243 779243

WALES
Abergele Computer Centre
Abergele. 0745 826234

Micro Fayre
Port Talbot. 0639 887730

Clwyd Computers
Denbigh. 074571 4156

WILTSHIRE
Wiltshire Micro Centre
Swindon. 0793 612299

YORKSHIRE
GG Cards and Books
Castleford 0977 558163

D & D Aslett
Wakefield. 0924 360551

Small Fry and Hobby
Wakefield. 0924 360551

Leeds Ind. Co-Op
Leeds 1. 0532 431333

Eltec Computers
Bradford. 0274 722512

CASTLE QUEST AVAILABLE FROM THE FOLLOWING BRANCHES OF BOOTS

Aylesbury. 0296 83661
Leamington Spa. 0926 24945
Worcester. 0905 22464/22631
Milton Keynes. 0908 607327/8/9
Solihull. 021-705 7553/4
Macclesfield. 0625 61521/6/7
Stockport. 061-480 5424/4 & 4605
Nottingham. 0602 40676
Derby. 0332 45886
Barnsley. 0226 82616
Chesterfield. 0246 203519
Sheffield. 0742 78333
Northampton. 0604 22573
Peterborough. 0733 65352
Leicester. 0533 21641
Coventry. 0203 26561
Chester. 0244 28421
Altrincham. 061-928 4471/2
Birmingham. 021-643 7582/3/4
Bridgend. 0656 59221/3
Basingstoke. 0256 51611
Cheltenham. 0242 27084
Swindon. 0793 36347/8
Weston-Super-Mare. 0934 29068
Llanelli. 0554 24615
Neath. 0639 3201
Newport. 0633 51212/3
Taunton. 0823 76061/2/3
Yeovil. 0935 26673/4/5
Truro. 0872 2810
Oxford. 0865 247461
Plymouth. 0752 266271

Newbury. 0635 40396
Southampton. 0703 333983
Bournemouth. 0202 33447
Fareham. 0329 232011
Dorset. 0202 681377
Bristol. 0272 293631/2/3/4
Gloucester. 0452 423501
Swansea. 0792 43461/5
Exeter. 0392 32244
Cardiff. 0222 31291/2/3/4/5
Reading. 0734 51262
Bournemouth. 0202 21703
Portsmouth. 0705 825245
Bath. 0225 63388
Sevenoaks. 0732 454276
Margate. 0843 20764/26901
Ramsgate. 0843 51864
Jersey. 0534 30432/3/4
Newport. 0983 522595
Boston. 0205 62138
Wellingborough. 0933 222019
Wolverhampton. 0902 27145/6/7
Sutton Coldfield. 021-354 1729
Stourbridge. 038 43 4157
Wrexham. 0978 262433
Shrewsbury. 0743 51311/2
Lowestoft. 0502 85717/8/9
Great Yarmouth. 0493 2680
Colchester. 0206 77303/4
Maidenhead. 0628 27892
High Wycombe. 0494 23128/21698
London. 01-734 4934

Basildon. 0268 21816
Hemel Hempsted. 0442 56288
Enfield. 01-363 0160
St. Albans. 0727 53036/53959
Sutton. 01-642 7575
London. 01-937 6882
Romford. 0708 68017/8
Ashford. 0233 25528
Tunbridge Wells. 0892 26486/7
Folkestone. 0303 54007
Canterbury. 0227 62572
Guildford. 0483 61535
Worthing. 0903 207106
Woking. 04862 61648
London W1. 01-734 6126
Horsham. 0403 3053
Uxbridge. 0895 33526
Hendon, London. 01-202 5256
Luton. 0582 20592
Wood Green, London. 01-881 0101
Bromley. 01-464 0231
Croydon. 01-688 6021/2
Chatham. 0634 405471
Maidstone. 0622 53912/52622
Dartford. 0322 23664
Eastbourne. 0323 27742/3
Brighton. 0283 27099/9/80
Slough. 0753 27267/7/8
Hull. 0482 223334
Mansfield. 0623 23089
Lincoln. 0522 24303
Rotherham. 0709 65671

Doncaster. 0302 62238
Burton-on-Trent. 0283 61573
Kettering. 0536 514675
Grimsby. 0472 51451
Hanley. 0782 23271
Newcastle. 0889 32047
Walsall. 0922 21555/6
York. 0904 53657
Dumfries. 0387 3859
Edinburgh. 031-225 8331/2/3
Bishop Auckland. 0632 329844
Scarborough. 0723 74455
Stockton-on-Tees. 0642 66402
Sunderland. 0783 70933
Burnley. 0282 21934
Glasgow 2. 041-332 1925
Glasgow. 041-248 7387
Belfast. 0232 242332
Aberdeen. 0224 582 5349
Newcastle upon Tyne. 0632 29844
Manchester. 061-832 6533/4/5
Rochdale. 0706 53225/6
Lancaster. 0524 64547
Blackpool. 0253 22276/7/8
Ashton-under-Lyne. 061-308 2326/7
Carlisle. 0228 42944/5/6
Leeds. 0532 433551
Middlesbrough. 0642 249616/7
Bradford. 0274 390891
Inverness. 0463 33796
Falkirk. 0324 20535/6/7
Warrington. 0925 574835/6/7

Oldham. 061-633 6136
Liverpool. 051-709 4711/2
Southport. 0704 33907
St. Helens. 0744 25488
Blackburn. 0254 50115
Glasgow. 03552 20629
Wakefield. 0924 76181
Huddersfield. 0484 21756
Hamilton. 0698 283679/283475
Stirling. 0786 4055
Dundee. 0382 21756/7
Bexley Heath. 01-301 1657
Kingston-on-Thames. 01-546 6235/6
Ballymena 0266 49611
Bedford. 0234 56231
Cambridge. 0223 350213
Bury St. Edmonds. 0284 701516
Market Rasen. 0673 843336
Ilford. 01-553 2116
Hounslow. 01-570 0156
Bognor Regis. 0243 821044
Manchester. 061-832 6533
Crawley. 0293 27158
Salisbury. 0722 3233
Paddington, London. 01-723 5862
Chelmsford. 0245 58252

ALSO AVAILABLE FROM
SELECTED BRANCHES OF
John Menzies
W.H. Smith
Kiosks (West of England) Limited
and most high street retailers

DEALERS CAN OBTAIN MICROPOWER SOFTWARE FROM THE FOLLOWING DISTRIBUTORS

Microdeal Distribution
0726 73456

Micro Dealer UK Limited
07073 28181

Wayfarer Computer Agencies
0743 66922

Centresoft Limited
021-359 3020

Leasalink Viewdata Limited (L.V.L.)
0602 392811

Tiger Distribution
0925 55099

Twang (Wholesalers) Limited
0734 580200

Websters Software Limited
0483 62222

R & R Computer Games
0226 710414

Terry Blood Distribution Limited
0782 620321

Oakleaf Computers
0476 60000

Express Marketing
021-771 4711

Bulldog Record Company
02602 77611

Drake Distribution
0752 500951

Greyhound Marketing Limited
0532 434006

Ferranti & Craig
0256 469966

Specialist Distribution
061-835 1353

Leisuresoft Limited
0604 46658

Lightning Records & Videos
01-969 5255

Solomon & Peres
08494 32711

Wonderbridge Limited
01-995 9060

Thorn EMI Software
0252 543333

Microworld
031-557 4196

Warwick Distribution
01-961 5646

Lendac Data Systems Limited
0001 710226

CASTLE QUEST
BY
MICROPOWER

CLARES Nº1 IN UTILITY SOFTWARE!

ENHANCED

BETA-BASE £25 DISC 8 GREAT FEATURES

WHAT IS A DATABASE?

It is a FILE which contains RECORDS. Records consist of a number of FIELDS containing the information—an analogy can be drawn with a card index in which a box of cards is the file. Each card is a record and each line on the card is a field.

SPECIFICATION

1) Random Access—disc based, single or dual drives
2) File Size—99K (40 track), 199K (80 track) —65,000 + records
3) Record Size—up to 2048 characters and 200 fields
4) Field Size—up to 254 characters with complete line scanning
5) Access any record using Primary Key in 2 seconds
6) Holds—1200 NAMES AND ADDRESS records on 100K disk
7) Search—500 records on 5 fields in 60 seconds
8) Sort—500 records on 3 fields in 60 seconds

SYSTEM FEATURES

- CALCULATE—using any valid expression and store results
- POWERFUL PRINTOUT OPTION—Eliminates need for separate mailing program, Parallel/Serial Printout allows setting of printer control codes, line spacing, tabulation, Headings etc, plus label printing with horizontal and vertical tab control.
- REDEFINE—Titles, field widths, number of fields, number of records etc.
- TRANSFER—Records from one file to another.
- SEARCH LISTS—Allow creation of sub-Databases within main Database.

NEW ✱

✱ GLOBALENTRY enables repetitive data to be typed in once and placed in as many records as required. Can also be used with a search list to provide a powerful global edit/update facility that will save hours of typing.

✱ SPOOLER enables you to create spooled files that are compatible with Wordwise, View and other word processors. You can therefore present your data within a document or in varying formats etc. The spooler program will allow to format your spooled file in the same way as the print out option. You can therefore have headings, columns, titles, numbers etc.

✱ INPUT is a routine included on the disc which will allow you to write utilities for accessing your data and tailored specifically to your needs.

✱ TUBE compatible with the 6502 second processor.

✱ Comprehensive manual and tutorial. All timings and sizes are relative to ACORN DFS. Compatible with ACORN DFS. WATFORD 1.3 and latest AMCOM DFS SERIES B.

✱ ORIGINAL USERS send your disc plus £3 for up grade.

clares
MICRO SUPPLIES

REPLICA II: £12.00. DISC

The original REPLICA set a very high standard so the specification we set our chief programmer included some impossible features. In fact ACORN state that some of the things that we have done are impossible, it just took us longer that's all. REPLICA II transfers most cassette based programs to disk, even more than REPLICA. When you buy disk drives you do not have to throw away expensive cassette based programs.

REPLICA II transfers 'LOCKED' programs, programs loading as files, programs that load below &E00, those with up to 6 sections and those up to &6E in length eg adventure programs. No waiting for 6 minutes whilst adventure programs load.

REPLICA II is very easy to use. The user enters a name, how many sections and whether CHAIN,*RUN or *LOAD to load the first section. Press play and let the program do the rest, even a menu.
Think how much it will cost you to buy just 1 disk version of your favourite program—REPLICA II which will hold up to 16 programs, limited only by the disk capacity.

FX 80 PRINTER DRIVER £12.00

PRINTER DRIVER FOR EPSON FX80 AND VIEW
Multi-page driver with print menu allowing the setting of global (document wide) printer functions at printer initialisation.
The print menu program contains a sophisticated character generator which allows the construction of 95 user defined characters which are then accessible from VIEW via a highlight option.
Supplied on disc with comprehensive user manual.

NEW

DISCDEX: £15.00 DISC

- Catalogues all your discs quickly and easily.
- Room to store four thousand titles.
- Quick search and load option.
- Compatible with single or dual drives.
- Extensive print options for catalogue and disc labels.
- Update and delete options.
- Supplied with stick on labels to number your discs and a supply of labels for printing your own disc labels.

DISCDEX is the answer to a disc users nightmare. How many times have you had to wade through your discs looking for the file that you know is there somewhere? Now with DISCDEX those days are gone.

DISCDEX will catalogue all your discs and store them in alphabetic order. In addition to the very useful search and load facility DISCDEX will also print out a full catalogue in alphabetic or disc order. Even more useful is the ability to print disc labels for sticking on the disc or the jacket.

DISCDEX is only suitable for discs with 31 file names as in the standard ACORN system. It is not suitable for double density interfaces.

Send for detailed newsletter.
All prices inclusive of VAT & Carriage—NO EXTRAS! Please state 40 or 80 track disc and state which D.F.S. you use

98 Middlewich Rd.,
Northwich, Cheshire CW9 7DA.
Tel: 0606 48511
Open 9—5pm Monday—Friday

NEW

ONESHOT: £12.00 DISC

- Full feature trace utility.
- Single step through BASIC program or halt at user determined interval.
- Print line number prior to execution.
- Obey fixed instructions before executing a line.
- Trace window allows screen to be seen whilst tracing execution.
- "Printer only" will force trace output to a printer allowing full screen display.
- Ability to dynamically alter control of ONESHOT.
- ONESHOT can be configured to run in any area of memory.

ONESHOT is a 1.25kb machine code program which gives the user several powerful aids in debugging BASIC programs. These include the ability to SINGLE STEP through the BASIC code of the target program, stopping the processing at specified points and comprehensive trace functions of the variables used by the target program.

A very powerful option allows the user to enter a command string into function key 0 and instruct ONESHOT to obey this command BEFORE each line is executed e.g. *KEY0 PRINT X%¦ M will print the value of X% before executing each line. This is a very simple example and it is possible to do much more complex things including printing the value of a variable only when it changes or when it reaches a certain value or falls within a certain range. This option can also be used to dynamically alter ONESHOT as it is working. The power of this option is only limited by the users ingenuity.

In addition to ONESHOT the disc also contains 3 very useful function key routines. The first will search for any DEFPROC or DEFFN and print the line numbers in which they appear together with the name of the procedure or function. The second will search for a specific procedure or function and print the line numbers containing it. The third routine will print out every active variable together with its present value.

ONESHOT is not compatible with double density interfaces.

NEW

FUN HOUSE: £10.00 DISC

FUN HOUSE is a highly original suite of educational programs suitable for ages 3 to 13. The program is designed to encourage children to spell words which relate to objects found around the home. Animation and music are used to good effect and some highly original ideas are incorporated. Each room exercise is terminated with a warning item e.g. the lounge finishes with 'FIRE' which goes on to engulf the whole lounge. Tests with a newly hired 4 year old resulted in us having to prise him away from the keyboard after 2 hours. In that time he had gone from never having used a keyboard to finding the location of all the keys very quickly and entering the correct answer. He had thus started on the path to learning spelling and familiarised himself with the keyboard including the use of DELETE to correct his mistakes. Can you afford not to give your children the same start?

FUN HOUSE is not compatible with double density interfaces.

All Disc Software now available on 3" disc— add £3 to printed prices

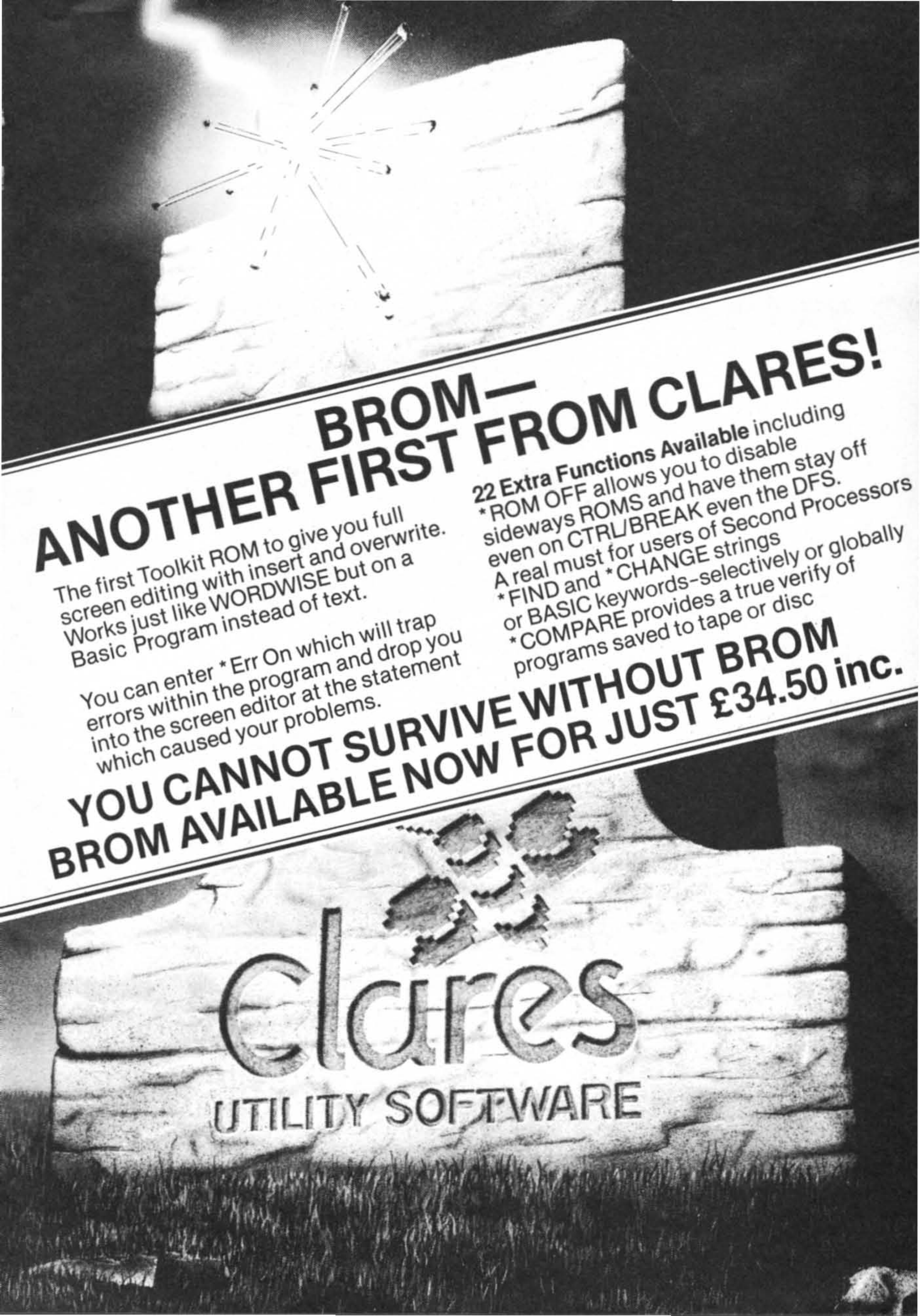
BROM—
ANOTHER FIRST FROM CLARES!

The first Toolkit ROM to give you full screen editing with insert and overwrite. Works just like WORDWISE but on a Basic Program instead of text.

You can enter *Err On which will trap errors within the program and drop you into the screen editor at the statement which caused your problems.

22 Extra Functions Available including
*ROM OFF allows you to disable sideways ROMS and have them stay off even on CTRL/BREAK even the DFS. A real must for users of Second Processors
*FIND and *CHANGE strings or BASIC keywords-selectively or globally
*COMPARE provides a true verify of programs saved to tape or disc

YOU CANNOT SURVIVE WITHOUT BROM
BROM AVAILABLE NOW FOR JUST £34.50 inc.



Low cost Hard & Floppy Disk Drives for your BBC

As specialists in the production and distribution of disk drives for micro-computers, Quest have drawn together their engineering expertise and commercial buying power to offer BBC micro users an unparalleled combination of performance and price.

FIREFLY HARD DISK

- 7.5 Mb of formatted data storage
- Fast, compact and reliable
- Unlimited number of files per disk
- Fully compatible with Acorn DFS
- Connects simply, via 1MHz Tube interface and plug-in ROM
- Full 6 month warranty, nationwide Quest engineering support
- Early delivery

ONLY £849 +VAT

NEW-FLOPPY DISK DRIVE

- Available now
- 100K 5.25" floppy disk drive
- Runs off BBC power supply
- Complete with cables
- Manual

ONLY £69.95 INCLUDES VAT

quest

Part of the Quest Automation plc Group of Companies.
Quest International Computers Ltd, School Lane, Chandlers Ford, Hants SO5 3YY.
Tel: Chandlers Ford 66321 Telex: 47326

The old and new combine to help you Look Sharp

THE aim of **Look Sharp** is to sharpen observational skills and visual memory, using two very different themes – Old Macdonald's Farm and SORT – the Space Observer Recruitment Text.

Old Macdonald's Farm features lovely graphic sheep, geese, pigs and cows in three different games.

The first – Memory – challenges the player to remember and reconstruct a farmyard scene. The two difficulty levels make this a good game for four to seven year olds, as well as being visually appealing and musically appropriate.

The two other games are Odd-One-Out – spot the blue eyed cow or the footless goose – and Snap, for one or two players. All these games are of excellent quality, and well suited to the intended age range.

SORT features space age scenarios for budding astronauts of seven years upwards in which the players are tested to find the best candidate for a space mission.

The three parts of the test all need a quick hand and eye. SORT 1 is visual perception where the player must rapidly compare two space age scenes of rockets, space stations and aliens.

MIRRORSOFT
LOOK SHARP!
by Widgit Software

A response to any matches between them will instantly send the blue rocket one stage nearer to take off. Too slow a response means a move upwards for the enemy red rocket.

SORT 2 is visual discrimination – one of those irritating games where the seven year old can spot the odd picture out of the six similar ones displayed about 10 minutes before you do. Once again right answers lead to your rocket ship blasting off successfully.

The visual memory test – SORT 3 – is the hardest of all. Imagine a picture made up of all nine elements, each of which can be one of 12 different space features.

You must memorise the whole screen, and then for each element, decide which feature was located there. This is truly mind bending, and incredibly frustrating – after all, logic tells you this is only a matter of concentration.

Fortunately for those of us whose reflexes and brain cells work slower than they used to, there are practice modes for each section so you can work your way up to the final space test.

Again, a fine collection of good ideas incorporated in good software design, particularly recommended for Space Invader weary parents.

Jane Jackson

BBC Micro B
BIRD STRIKE
FIREBIRD

Excitement? Well . . . possibly

IF you have a musical ear, you may be attracted to **Bird Strike** from Firebird Software. Music plays a big part in this game, as you realise after a few seconds' loading.

All of a sudden, the micro breaks into a frenzied version of "It's a long way to Tipperary" – the sort of version Liberace might produce if let loose on a synthesizer after a few pints.

Once the rest of the program has loaded, and you've read the

Gardening comes in from the cold

CAMBRIDGE Applied Technology has released two Greenfinger programs to aid the amateur gardener on those long, cold winter days when practical gardening is impossible.

One is the **Garden Plant Selector** and the second a **Garden Layout Planner.**

Both are reasonably user-friendly. The Plant Selector shows yellow text on a blue background prompt and offers two options – either information on individual plants or, better still, advice on which plants thrive best in any given site in your garden.

The choice of plant type is broad and includes border plants, cacti and succulents, climbers, indoor plants, rock garden plants and shrubs and trees.

Whichever option is selected the data master file cassette has to be loaded and a change of message and colour indicates if this is proceeding. Unfortunately it will not tolerate simple errors like lack of spaces between words, misspellings or extra spaces between words.

The individual option selects your plant and gives details of flowers and foliage and what sunlight, moisture and soil-type are needed as well as hardiness, eventual height and means of propagation.

No Latin names are used, probably because of memory shortage. Perhaps instead the common names could have been included in the documentation since they are so variable and then the Latin alternatives could have been used in the program. Also no metric measurements are included.

The search option offers a very limited plant choice. Here again, perhaps indoor plants could have been omitted to admit more outdoor types and perhaps include trees.

Based on the garden situation chosen plants are selected but since there are no accurate limits of rainfall this is not always as successful as it should be.

Documentation for Plant Selector includes good running instructions and a plant common name index. Perhaps more detailed cultural instructions could have been included.

The Layout Planner uses the same successful screen layout as the Selector. It allows old layouts to be reviewed and revised as well as producing new ones.

Both programs could be extremely useful educationally in teaching the application of the BBC Micro in computer modelling and design. At £12.95 each they represent good value for money.

Peter Hillman

From Page 53

instructions, you are treated to a few bars of "Colonel Bogey", followed by the famous introductory notes to Beethoven's Fifth.

Three musical themes, and the game hasn't even started yet – promising!

However, Bird Strike turns out to be yet another variation on the shoot-em-down-and-win-a-coconut type of game.

You are presented with a pleasant view of a river valley, a cluster of houses on one side, and a churchyard on the other – somewhere in Europe in 1914 according to the micro.

At the bottom is your cannon, and from the top biplanes float down, trying to get you before you get them. Only a hit dead centre destroys them, but herein lies the novelty.

Winging a plane results in the release of a carrier pigeon and shooting this results in the addition of a musical note to a stave at the top of the screen.

Complete the stave and you've defeated that wave of planes. To celebrate, the micro plays the music you've "composed" – a few bars of "John Brown Body". Then it's on to the next wave.

There are four in all – biplanes, monoplanes, jets, and something that looks like a Chinook helicopter – all a bit odd for 1914. After the fourth wave, you get all four staves of John Brown, and then it's back to the beginning.

Promising as I said but for me the game didn't live up to its promise. Jack Charlton would undoubtedly approve of blasting away at pigeons, but I'm not so keen.

As they flutter across the screen, they utter a few dispirited cheeps, rather like a sparrow that's had a bad day at the races and I felt a bit mean shooting them down.

The game doesn't seem to progress much. It does get a bit harder to avoid being hit, but nothing new happens and I ended up getting bored with the whole thing.

Admittedly, the graphics and use of sound are good, but on the whole the game seems to lack something.

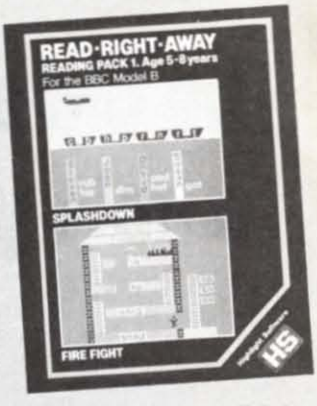
Excitement . . . possibly.

James Bibby

Shrieks of joy show improvement

READ-Right-Away Reading Pack 1 (Highlight) contains two programs which combine a definite educational content with a real games approach.

The result is that the children I used as guinea-pigs responded very well, enjoying the games and learning as a by-product.



Splashdown has a slightly strange format in that the idea is to bomb a boat and send it to the bottom of the sea. I do wish programmers would adopt a healthier approach to violent themes such as this.

I am sure that this is only a minor criticism and it certainly should not put you off looking at the package.

An aeroplane, quite well designed, flies across the screen.

QUICK RUNS

A first look at some of the latest releases

Ultron: *Destroy the waves of aliens, avoiding or destroying the asteroids before docking with the mothership. All photon blasts missing their targets will be recorded as wastage and an excess will result in the destruction of your laser base. After a successful docking your bonus will reflect your shooting accuracy.* (Visions)

* * *

Flight Path: *An educational package aimed at 10-15 year olds in which the child takes on the role of an airline captain. The program involves making accurate calculations and logical decisions to produce a successful flight. Destination and departure airports must be selected along with the most suitable aircraft. Weather conditions must be taken into account. The package contains wind and speed tutorials if needed.* (Storm)

* * *

Castle Quest: *An interactive adventure/strategy game which features arcade action and graphics. Only by correct use of the artefacts provided and solving the puzzles correctly can you hope to finish your tour of the castle. Once the quest is completed the arcade game element can be enjoyed with hi-scores and time limits to beat. At this point players can enter a £500 competition to find the Castle Quest champion.* (Micropower)

* * *

Ledgeman: *Control Ledgeman in his search for hidden caves which contain an abundance of precious stones. You must be wary of the guardians of the cave, lively barrels, meteor storms and the host of wandering nasties if you are to succeed.* (Software Projects)

* * *

Statix: *Test both ingenuity and reaction time as you try to outsmart the Statix – a dangerous electrical charge. To gain control of the screen and escape you must draw new boundaries hemming in the Statix as it attempts to protect its territory. Each new magnetic field reveals a more powerful, agile enemy.* (Psion)

* * *

Roboman: *Control our intrepid hero and take up the challenge to save the last human family from being exterminated by robots. With your trusty laser you must blast the Grunt Robots, and obliterate the Hulks. Beware the mutating brains, spheroids, tanks and cannon balls as they home in on you.* (Alligata)

The Music Box: *An educational adventure program designed for the 8-14 age range, it seeks to reinforce learning of direction and movement using compass points, vectors and bearings. Logical thinking and decision making are also put to the test in this search for two keys to an old music box.* (Selective)

* * *

Lingo: *An educational wordgame package for up to four players intended to make learning fun. The micro deals 12 random words to each person and displays a pool of terminations, articles and conjunctions. Sentences are to be made up which must be meaningful and grammatical and players are encouraged to challenge each other if this is in doubt.* (Complete Micro Service)

* * *

Perils of Percival Penguin: *Can you guide Percy to safety to the end of four screens of ice fields before the bleak winter sun sets on the last of his four lives? Searching for fish, you must find a safe way across the blocks avoiding crevasses, patrolling leopard seals and skuas. Your hopping power will reduce if your energy gets too low.* (Willow)

* * *

Insure Your Car/Bike: *Two independent educational packages aimed at the young*

A 'wordboat' is positioned below with one letter missing from the letters which make up the boat's shape. The child selects the appropriate letter to complete the word, and the micro holds a store of the correct possibilities.

An error results in a noise, and another go, while a correct response sinks the boat which is added to the 'word-bank' at the bottom of the sea. When this reaches five, a submarine moves across the scene, with full sonar sound effects.

One serious criticism I would make is that each game lasts for only five attempts, and the child presumably would not know which levels to select.

Thus the teacher/adult must presumably be present throughout.

Fire Fight has far superior graphics, a far happier theme, but a similar purpose. The child has to supply a consonant blend (for example, "sp") which begins a half-missing word.

The fireman is moved by using the up and down keys, and the correct blend selected by pressing Return. An error again results in a noise, and the flames creep closer to a damsel who has to be rescued by our hero from the top floor.

A correct response allows one of the floors to be bridged, with the fireman dropping the consonant blend into the gap. If all floors are successfully bridged, the damsel is rescued to the great delight of the children.

Again the options are quite wide, with five skill levels and five possible combinations of consonant blends. From the list, between two and four specific sounds can be practised.

I can understand the children's shrieks of joy, especially in the second game.

Overall, the programs are among the better ones I have seen and used, and show a welcome improvement in the standard of educational programs in the primary sector.

Phil Tayler

I can pay no greater compliment

RETURNING **Plutonium Plunder** by Micropower to the editor is going to be a sad wrench – the game is fascinating.

It is an arcade game on the general lines of Pengo. The object in this version is to push three cannisters of plutonium into a safe-room at the end of a vault.

This is done by controlling a little man who goes dashing round the vault pushing the cannisters – and a dangerous time he has of it.

Firstly, they are mixed in with large numbers of hexoid pods, six-sided objects that have to be pushed aside or drilled through. Secondly, there is a posse of bad-tempered gnomes out to get you.

PLUTONIUM
PLUNDER
BBC MICRO
MICRO
POWER

They follow you around with the dogged persistence of a debt-collector with a grievance, and if they catch you, it's back to square one. The only way to deal with them is to flatten them by pushing a pod or cannister over them.

Thirdly, after a certain time, a

road user who can frequently fall foul of the law. The micro – playing the part of an insurance broker – attempts to familiarise potential road users with the process of completing an insurance proposal form and costing a quotation on the contents. The packages contain a variety of worksheets to encourage class involvement. (Step)

* * *

Crypt Capers: *Deep in an unknown Egyptian pyramid your aim is to find the Pharoah's chamber. You must face a variety of nasties in the form of snakes, fireballs, triads and shrinking ghosts as you search for the keys that will unlock the doors. Use your gun to destroy the enemy and beware the magic non-destructable rocks.* (Software Projects)

* * *

Darts: *This computer simulation supports the options 501, 301, round the board, and practice. You aim the dart using cursor keys, and the length of time the space bar is pressed determines the strength of throw.* (Superior)

* * *

Colours and Shapes: *Educational package to aid children in the recognition of colours and shapes. The package is also aimed at developing their ability to place them in logical arrangements. Five levels of difficulty ensure use for a wide primary school range.* (1A Business Computing)

* * *

Identify Europe: *Provides a means of discovering and learning European geography. Designed for all ages, the program allows the user to specify the subject and the number of questions to answer. A detailed map is drawn on screen and a series of multi choice questions are asked. A wrong answer is explained and a second attempt is offered as the package keeps track of your performance at all times.* (Kosmos)

* * *

Landing Party: *As captain of USS Endeavour you must undertake a deep space mission to rescue your first officer Mr Spark. You have planets to explore, space stations to visit, Zingons to confront, not to mention the asteroids and black holes. Your ship is controlled with single keys from a menu as you search for your quarry.* (Willow)

* * *

Ewgeebez: *Zelob the Melkon has been marooned on the space station Ewgeebez and you control his attempt to escape. Collect 12 power crystals to activate the main teleport which must be found in the mass of corridors before you. You must take on the alien creatures which teleport from a nearby planet, and the station's own defence mechanisms – patrolling robots armed with lasers.* (Software Projects)

* * *

Keyboard Chord Tutor: *The program generates the finger positions for 144 chords and their inversions on a two and a half octave keyboard display. It contains 98 progressions of from two to five chords which commonly occur in music and the replay memory retains up to 64 of the most recently generated chords.* (Adby Associates)

* * *

Musicmaker: *A three part package. The first is a synthesiser with full colour graphic display of sound settings, a four octave, three note polyphonic keyboard and facilities for saving and loading of files. The second consists of two data files to assist the inexperienced user get the best out of the programs. Finally there is a 46 page manual which, in addition to explaining use of the system, gives some instruction in the basics of sound synthesis.* (FSoft)

From Page 55

couple of radio-active neuclids burst through their containing shields and start chasing you round, while arrow-like megapods whizz through the side walls and attempt to place you in an early grave.

As if this wasn't enough, some joker has electrified the walls, so that touching them results in your little man lighting up like the Blackpool Illuminations, before shuffling off this mortal coil.

The net result of all this is a game that is fast, furious, and completely addictive. The graphics are excellent – even on my clapped-out old TV – and there is good use of sound and colour. The game can be played with a joystick or with the keyboard, and if you dislike the choice of control keys, a facility for re-programming your own choice is provided.

It doesn't get boring either. I've got as far as level five – each is different, calling for a change of tactics.

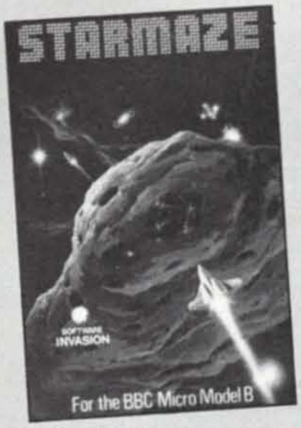
Unfortunately, by the time you read this, the editor will be playing with my review copy in his luxury penthouse at Europa House.

Not to worry. I've decided to go out and buy my own copy – what greater compliment can a reviewer pay a game than that?

James Bibby

Join in the a-mazing jewel hunt

IN **Starmaze** you must steer your spaceship through an overgrown maze searching for rare jewels. Your ship is armed with a laser-cannon and an endless supply of ammunition.



On your lonely trek you will encounter alien fighters, bird-hatching eggs – which lay homing mines – and rotating alien satellites.

To obtain the jewels you must simply fly over them and return to the mother ship, fly over that and collect your points. You may only carry one jewel at a time though.

Software Invasion have made no provision for a joystick in this game and, although the keys and movement of the ship are smooth, pressing too hard on the thrust key could prove fatal.

The deeper you travel into the maze the more hazards you encounter. You can escape danger by entering to hyperspace at the cost of some fuel.

You can also use one of your three smart bombs which will destroy everything on the screen.

Trying to remember your way around the maze is a nightmare. A nice touch would have been the inclusion of a radar scanner to show where your ship is and how close it is to your mother ship.

Constantly displayed down the far right-hand side of the screen are fuel indicator, remaining fighter ships, score, high score, jewels obtained, remaining smart bombs and level reached.

To refuel your fighter you must fly over the mother ship.

The Micro User Index of software reviews

3 Deep Space (Postern)	Feb 1984
3D Bomb Alley (Software Invasion)	Jan 1984
3D Grand Prix (Software Invasion)	Jan 1985
Action of the Heart (Garland)	Sep 1983
Aid (Lincoln)	Jan 1984
Alien Destroyers (Program Power)	Aug 1983
Alphabeta (H & H)	Mar 1983
Angle (Chalksoft)	June 1984
Animal/Vegetable/Mineral (Bourne Educational)	Oct 1983
Answer Back (Kosmos)	July 1984
Apollo (Software Invasion)	May 1983
Arcadians (Acornsoft)	Aug 1983
Arena 3000 (Microdeal)	Jan 1985
Art Designer (Pica)	Jan 1985
Artist (MRM)	Dec 1984
Atlantis (IJK)	Mar 1983
Attack on the Somme (Tressell Publications)	Jan 1985
Aviator (Acornsoft)	June 1984
BBtype (Furey Enterprises)	Nov 1984
Beebcalc (Gemini)	Sep 1983
Beebshop (Alpha Computer School)	Nov 1984
Beebsynth (Clares)	Nov 1983
Beta Base (Clare)	Sep 1984
Billiards (H & H)	Mar 1983
Biology (Silverlind)	Nov 1984
Birds of Prey (Romik)	Dec 1984
BMX on the Moon (Superior)	Jan 1985
Boris in the Underworld (Superior Software)	Oct 1984
Bouncing Bill (Oak)	Dec 1984
Bridge to the East (Ixion)	Mar 1984
Bugblaster (Alligata)	Dec 1984
Bun Fun (Squirrel)	Aug 1983
Business Games (Acornsoft)	Mar 1984
Canyon (BBC Soft)	Oct 1983
Cashbook (Gemini)	Aug 1983
Cash Book/Final Accounts (Gemini)	Oct 1984
Castaway (Simonsoft)	Oct 1984
Castle Assault (MRM)	Sep 1984
Castle of Riddles (Acornsoft)	Jan 1984
Chess (Bug Byte)	Apr 1983
Chess (Acornsoft)	Dec 1983
Chess (Computer Concepts)	Dec 1983
Chickaroo (Screenplay)	May 1984
Circus (Digital Fantasia)	Jan 1984
Colossal Cave (Level 9)	Feb 1984
Commercial Accounts (Gemini)	Jun 1983
Community (Ixion)	Mar 1984
Connect 4 (Database)	Apr 1983
Cosmic Kidnap (Superior Software)	June 1984
Countdown to Doom (Acornsoft)	Jun 1983
Count with Oliver (Mirrorsoft)	Feb 1985
County (SM) (Bryants)	Mar 1984
Cylon Attack (A & F Software)	Feb 1984
Dambusters (Alligata)	Oct 1984
Das Schloss (Chalksoft)	Feb 1985
Data Structure Demo (DP Publications)	Jan 1985
Datext (Optima)	Jan 1984
Dbasebeeb (Carrera)	June 1984
Delivery (Paean Systems)	Apr 1984
Denis thro' Drinking Glass (Applications)	Nov 1984
Developing Cities (Nelson CAL)	Jan 1985
Devil's Causeway (Kaydee)	Sep 1983
DFS (Amcom)	Sep 1983
DFS (Watford)	Sep 1983
DFS (Amcom)	Oct 1983
Digger (Visions)	Oct 1984
Disc Executor (Vision Software)	Jan 1984
Dragon Rider (Salamander)	Oct 1983
Duck (Firebird)	Feb 1985
Eagle's Wing (Software Invasion)	Oct 1984
Easy Crasher (Salamander)	May 1984
ECFG (Gaelsett)	May 1983
Elite (Acornsoft)	Nov 1984
Escape from Moonbase Alpha (Program Power)	Apr 1984
Escape from Orion (Hopesoft)	Nov 1983
Essential French Verbs (Carsondale)	Dec 1983
European Knowledge (Micropower)	Jan 1985
Evil Dead (Palace)	Feb 1985
Eye (Longman)	Aug 1984
Facemaker (Ask)	Jan 1984
Fall of Rome (ASP)	Oct 1984
Firehawks (Postern)	Dec 1983
Five spheres of Goliath (Kansas)	Sep 1984
Fletchers Castle (Fernleaf)	Oct 1984
Flints Gold (Micrograf)	Aug 1984
Fmon (Fsoft)	Dec 1984
Forth (Level 9)	Nov 1983
Fortress (Amcom)	June 1984
Frak (Aardvark)	Oct 1984
Frac Attack (Shards)	Feb 1985
Franklin's Tomb (Salamander)	May 1984
Frenzy (Micropower)	Nov 1984
Frogger (A & F Software)	Mar 1983
Fruity Freddy (Softspot)	July 1984
Fungames (BBC Soft)	Apr 1983
Fun to Learn (Shard's Software)	May 1984
Galactic Firebird (Kansas)	Nov 1983
Galaxy Raiders (Visions)	Dec 1984
Gate Crasher (Quicksilva)	Dec 1984
German Sentence Practice (Educated Owl)	Dec 1983
Ghouls (Program Power)	May 1984
Grafkey (Clares Soft)	Apr 1983
Graph Easy (Hama)	Dec 1984
Great Britain Ltd (Simon Hessel)	Jun 1983
Gunsmoke (Software Invasion)	Nov 1983
Heist (Softspot)	Aug 1984
Hide & Seek (Applied Systems)	Nov 1984
Hide & Seek (Ask)	Jan 1984
Hobbit (Melbourne House)	June 1984
Home/Business Pack (Gemini)	June 1984
Home Finance (BBC Soft)	May 1983
Hopper (Acornsoft)	Sep 1983
Horror Castle (A & F Software)	May 1984
Horselord (Century)	Feb 1985
Hunchback (Superior Software)	May 1984
Hyperdrive (IJK)	Mar 1983
Inheritance (Simon Hessel)	Jun 1983
Into the Unknown (Tressell Publications)	Jan 1985
Invaders (IJK)	Mar 1983
Invaders (Software Invasion)	May 1983
Jet Boot Jack (English)	Feb 1985
Jigsaw (ega beva)	May 1984
Jump Challenge (Martech)	Feb 1985
Junior Maths Pack (Program Power)	Oct 1983
Key Definer/Char Gen (Gsoft)	Sep 1984
Laser Reflex (Talent)	Dec 1984
Lemming Syndrome (Dynabyte)	June 1984
Let's Count (Ask)	Jan 1984
Lift off with numbers (Shiva)	Aug 1984
Lines and Angles (4mat)	Aug 1984
Love and Marriage (Acornsoft/Ivanberg Software)	May 1984
Lords of Time (Level 9)	May 1984
Lost in Space (Salamander)	July 1984
Lunar Rescue (Alligata)	Dec 1984
Machine Code Tutor (New Generation)	Oct 1984
Man (Chalksoft)	June 1984
Map Skills (Cambridge)	Dec 1984
Marklist (Optima Software)	Apr 1984
Mary Rose (Ginn)	Jan 1984
Mental Arith Tests (Small Schools)	Nov 1984
Missile Base (Acornsoft)	Apr 1984
Mr Whiz (Superior)	Nov 1984
Multibase (G Soft)	Oct 1984
Music (BBC Software)	Apr 1983
Music Editor (System)	Dec 1983
Music Synthesiser (Bug Byte)	Jul 1983
Music Tutor (Garland)	Oct 1984
Mystery of Java Star (Shards)	Nov 1984
Nightmare Maze (MRM)	Dec 1984
Number Chaser (Applied Systems)	Nov 1984
Number Puzzler (Ask)	Jan 1984
Oblivion (Bug-Byte)	Apr 1984
Old Father Time (Bug Byte)	Jan 1984
One Disc Home Office (Dr. Soft)	July 1984
Omega Probe (Optima Software)	May 1984
Osprey (Bourne)	Dec 1984
Package 004 (Software Invasion)	Jun 1983
Paintbox (Oakleaf)	Mar 1984
Painter (A & F Software)	May 1983
Pascal, Sequences, Puncman (Chalksoft)	Nov 1983
Peeko-Computer (Acornsoft)	Feb 1984
Pengo (H Soft)	Feb 1984
Philosopher's Quest (Acornsoft)	Jan 1984
Physics (Program Power)	Dec 1983
Physiological Simulation (Fiveways)	Dec 1983
Pimania (Automata)	Mar 1984
Plunder (CCS Strategy)	Nov 1984
Practise and Play (Special Business)	Nov 1984
Printer Monitor (Watford)	Mar 1984
Programs I (BBC Soft)	Apr 1983
Reading Music (Childsplay)	June 1984
Renegade Robots (Senator)	Nov 1984
Rocket Raid (Acornsoft)	Jul 1983
Rubble Trouble (Micropower)	Sep 1984
Ruin (Notts CC)	Jan 1985
Savage Pond (Starcade)	Nov 1984
Screen Dump (DACC)	Mar 1984
Screwball (MRM)	Nov 1984
Sea Adventure (Virgin)	Nov 1984
Sea Lord (Bug-Byte)	Apr 1984
Share Analyser (Synergy)	Jan 1985
Shrinking Professor (A & F Software)	Apr 1984
Sinbad (Virgin)	Jan 1985
Slick (BP Educational)	Jul 1983
Smash & Grab (Superior)	Dec 1984
Snapper (Acornsoft)	Dec 1983
Snooker (Acornsoft)	Oct 1983
Snowball (Level 9)	Feb 1984
Spaceman Sid (English Software)	Jan 1985
Space Pirates (Bug Byte)	Mar 1983
Spellcheck (Beebugsoft)	Nov 1984
Sphinx Adventure (Acornsoft)	Jan 1984
Spooks and Spiders (Software Inv)	Sep 1984
Spreadsheet (Microl)	Nov 1983
Sprite-Gen (DACC)	Dec 1983
Sprites 2 (Simonsoft)	Sep 1984
Spy (System)	Nov 1983
Star Maze II (Kaydee)	Oct 1983
Starship Command (Acornsoft)	Oct 1983
Stock Car (Micropower)	Sep 1984
Superfruit (Simonsoft)	Aug 1984
Supergolf (Squirrel)	Mar 1984
Swag (Micropower)	Jan 1985
Swoop (Program Power)	Sep 1983
Swordmaster (Acorn User)	Nov 1984
Tarzan (Alligata)	Dec 1984
Taxcalc (BBC Soft)	Nov 1983
Tense French (Sulis)	Sep 1984
Tess (H & H)	Apr 1983
Text Editor (G Soft)	Oct 1984
The Grange (Dobsoft)	Jan 1984
The Lair (Utopia)	Nov 1984
The Synth (Musicsoft)	Aug 1984
Timeman One (Bourne Educational)	Sep 1983
Toolbox (BBC Soft)	Mar 1984
Tourism (Nelson Cal)	Jan 1985
Transistors Revenge (Softspot)	June 1984
Uncle Claude (Alligata)	Nov 1984
Vampire Castle (Micrograf)	Aug 1984
Vectors (Salamander)	Dec 1984
Vortex (Software Invasion)	Sep 1984
Vu-File (Psion)	Nov 1983
Wallaby (Superior)	Dec 1984
White Knight (BBC Soft)	Dec 1983
Winged Warlords (Superior)	Feb 1985
Wordhang (Bourne Educational)	Oct 1983
Wordwise (Computer Concepts)	Jul 1983
Zany Kong (Solar Soft)	Sep 1983

Every 10,000 points scored you receive an extra fighter and a smart bomb.

Starmaze has a high level of difficulty and will take a long time to master. Unfortunately, there is no pause facility or sound on/off option which by now should be standard on quality software.

However, if you want a game with acceptable graphics, quite fast and hard to complete, then Starmaze is the one for you.

Simon Rubins

Poor Felix – he's under attack yet again

FELIX
Evil Weevils
B.B.C. MICRO
MICRO POWER

FELIX meets the Evil Weevils is the third episode in the rather hectic life of our hero Felix, the other two being Felix and the Fruit Monsters and Felix and the Factory.

Once again an industrial setting has been used and the scene is constructed of several levels of conveyor belts connected by numerous vertical pipes.

Felix is chased around the scene by weevils which increase in number with each new screen. To destroy a weevil Felix must collect a can of insecticide and squirt it at the pursuing nasty.

At various points around the screen there are mutation chambers and should a weevil enter one of these it mutates to become a purple superweevil.

These devils are twice as fast as the common or garden green weevils and are immune to the ball bearings.

The ball bearings? Yes, not only must Felix kill the weevils but he must avoid the constant procession of ball bearings that fall from the top level and follow the direction of the conveyors falling down any pipes they may encounter.

Letters are placed randomly around the factory. Collecting them all to spell the word BONUS gives you a further 1,500 points. Oxygen cylinders will also appear from time to time and these must be collected to replenish Felix's ever decreasing oxygen level.

One final object is the conveyor control lever. Having acquired this little device one can change the direction of the conveyor belt by pressing Shift.

Having been a fan of Felix in the Factory I was not disappointed with this latest adventure. The characters are colourful and detailed and the fluidity of the crawling movements as the weevils make their way around the factory is excellent.

My only complaint about the game is the title Micropower have chosen. There are no actual weevils – long-snouted beetles – in the game, just a number of green and purple caterpillars. Maybe Felix meets the Evil Green and Purple Caterpillars didn't sound right.

Jon Revis

Run the gauntlet–the plans must get through

IN **Dune Rider** by Micro Power the planet Zennon is besieged by hostile aliens and you, a galactic courier, are entrusted with plans vital to the planet's defences.

Climbing aboard your powerful dune rider, your task is to outwit the intruders during a perilous journey.

You and your trusty laser cannon run the gauntlet of aliens which whirl overhead and make bomb attacks.

To add to your troubles lava pits are scattered across the desert appearing at random at the most inopportune moments.

If you run into one you and the dune rider are spread across the desert in an eyecatching explosion.

The only way to avoid the pits is to hop your vehicle over them and that's not as simple as it sounds.

MICRO POWER
BBC MODEL B
DUNE RIDER

In addition there are outcrops of rocks which are also targets for your vehicle's athletic jumping ability. If you can't jump them you must blast them.

Throughout the game your fuel supply slowly diminishes. Your only means of replenishing it is to shoot an alien tanker and catch the fuel cannister as it tumbles from the sky.

The graphics are simple but effective and the sound is used quite cleverly. Movement keys are user definable and there is a joystick option.

I found the game extremely addictive and fun to play.

Dave Mac

One for the budding geologist

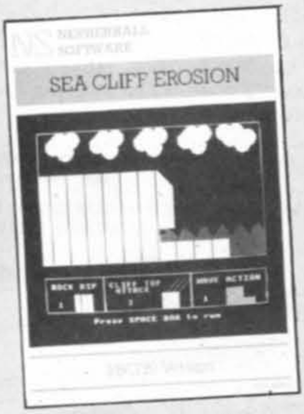
NOW you can enjoy a trip to the seaside without leaving your armchair. But don't be fooled, **Sea Cliff Erosion** (Cambridge) is purely an educational program for budding geologists.

One can talk about and show pictures of the results of natural erosion processes but it is sometimes difficult to relate geographical features we see today with the processes said to have formed them – the Grand Canyon being a case in point.

This program is an attempt to bridge this difficulty in understanding by showing the steady effects of sea and weather action on a cliff face.

It is a clever program but only a limited number of variables can be taken into account when setting up each simulation, and this is its weakness.

In reality a large number of variables affect the shape of any landscape but this program only allows the user to alter three parameters: the rock dip (slope of bedding), severity of cliff top erosion by weather and severity of wave action.



Perhaps the major omission is an option to vary rock type at different levels, important when one considers the structure of many of the cliff faces in Britain.

However, the program succeeds in illustrating the stages of weathering, deposition and scouring which take place over the lifetime of a typical cliff face.

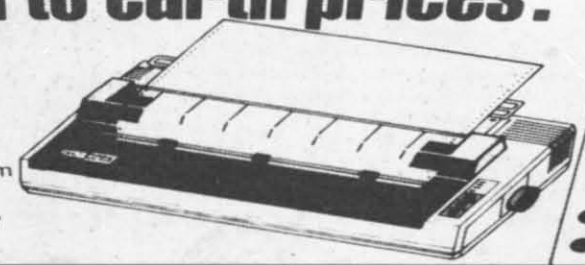
It centres on the animation of a single screen display which can be altered by changing numerical values in the option boxes at the bottom of the screen, these being rock dip, cliff top attack and wave action. The process can be stopped and restarted at any stage so that the variables can be altered.

I would have liked to have seen a larger range of rock dip angles, but on the whole there is enough variation to obtain some idea of the effects different dip angles have on the formation of a shoreline.

A well written manual gives suggestions for work sheets and, although the program is aimed at 13 to 16 year olds, I feel it would be more appropriate for sixth form classes.

John Daddy

DATA STAR QUALITY
At down to earth prices.



When it comes to printers, whichever way you look at it, we've got the lowest prices, the widest range and the best back-up service in the country.
What you won't get from us, are special gifts, or false promises – just honest value and a fully guaranteed after-sales service.

SPECIAL OFFERS

Brother – M1009 £173.86 + VAT = £199.95

50cps ● bi-directional ● logic seeking ● 96 chars plus international and graphics ● 9 x 9 matrix.

Gemini 10X £189.95 + VAT = £218.44

120 cps. ● bi-directional ● logic seeking ● friction, tractor and roll holder standard ● down loadable characters ● ultra high resolution ● 80 cols. ● IBM PC version available.

Kaga-Taxan KP 810 £257.00 + VAT = £295.55

Near letter quality ● 160 cps ● bi-directional ● 96 chars. plus graphics ● 5 print sizes ● 9 x 9 matrix.

COMPLETE RANGE

DOT MATRIX

Cosmos JP 80 £169.95 + VAT = £195.44
Epson RX80 £198.95 + VAT = £228.79
Epson RX80 F/T £228.95 + VAT = £263.29
Epson FX80 £319.95 + VAT = £367.94
Epson FX100 £498.95 + VAT = £573.79
Star Gemini 10x £189.95 + VAT = £218.44
Star Delta 10 £319.95 + VAT = £367.94
Star Radix 10 £498.95 + VAT = £573.79

THERMAL MATRIX PRINTERS

Brother HR5 *Ring for prices*
Brother EP44 *Ring for prices*

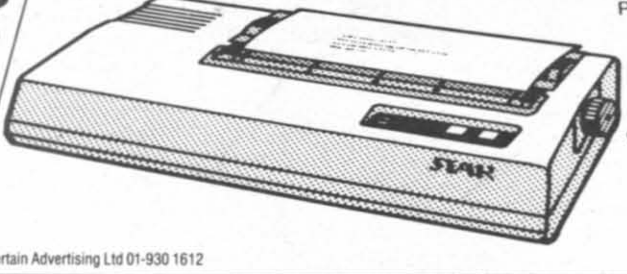
DAISYWHEEL PRINTERS

Brother HR15 *Ring for prices*
Juki 6100 £325 + VAT = £373.75

Cables ● Paper ● Ribbons ● Sheet and tractor feeders ● Interfaces

If you have any technical queries or want our latest prices please telephone:

Credit card hot line . . . 01-482 1711



Please add £10 for delivery, we guarantee 48 hour delivery from payment. Personal callers welcome. We're at the junction of Camden Road, near the railway bridge. Anytime 9.00am to 6.00pm Monday to Friday 10.00am to 1.00pm Sunday. Export and dealer enquiries welcome. Post your order with cheque to

© Certain Advertising Ltd 01-930 1612

Datastar Systems UK

Unicom House, 182 Royal College Street, London NW1 9NN
Telex 295 931 Unicom G Telephone 01-482 1711

PROBLEM PAGE

Your technical queries answered by MIKE COOK

COULD you suggest a way to eliminate the annoying background hiss from the speaker on my BBC Micro? It is incredibly persistent even with my television set disconnected from the micro altogether.

It is always worse when the machine is busy – listing programs, drawing graphs on the screen, accessing the disc and so on. It is unaffected by adjustments made to the speaker potentiometer on the main board.

Reassuringly, it goes away under two conditions – switching the micro off and disconnecting the speaker lead – neither of which offers a permanent solution.

If it is of any help, my BBC has an issue 7 main board. – *D.R. Way, Peterborough, Cambs.*

● **All BBC Micros pick up noise on their speakers to some extent. It is difficult to say if yours produces excessive noise.**

Issue 7 boards will have the 10k terminating resistor across the amplifier input labelled "analogue in" on the 1MHz bus. These need fitting on issue 3 boards and earlier.

If it is unaffected by the volume control then it is being picked up in the final amplifier. This could be due to poor power supply regulation.

To remedy this you could solder a thick wire from pin 4 of the amplifier IC19 to the negative spade connector and another from the positive to pin 6 of IC19.

If the problem still persists try soldering decoupling capacitors on the underside of the board as close to the IC as possible. Try using a 0.1uF disc ceramic and a 47uF electrolytic capacitor. It is essential that these leads be as short as possible.

Screen gets the shakes

I HAVE a BBC Model B 1.2 OS. When I am using it, static electricity often causes the screen to shake, sometimes so badly that I cannot tell what is on the screen for anything up to 10 minutes.

This often happens when I am playing games, but when I have stopped pressing any keys, the static stops.

I use the micro on a wooden topped table and I make sure none of the leads are crossed, and I never wear nylon clothes. – *Kevin Lomax, Bolton, Lancs.*

● **You are wrong, you are not suffering from any static electricity problems so you can get back to wearing nylon clothes!**

As you say the 'static' stops when you stop pressing keys so it can't be static because static remains still. That's how it gets its name.

No, you are suffering from poor supply regulation to the video modulator. This can be cured as mentioned in my reply to Mr Way.

Space to spare

AFTER I recently opened up my BBC 32k model B I discovered a space on the circuit board next to the Econet connector for a reset button.

Is it possible to fit one and if fitted what type of reset does it perform?

Is it possible to get a colour video output from the video BNC connector? – *John Halkiadakis, Victoria, Australia.*

● **Connecting a push button to do this will perform a reset on the microprocessor. This is equivalent to pressing Break.**

After the reset the micro determines if any other keys are being held down and so takes the appropriate action.

To obtain colour from the video BNC socket link S39 just next to the video modulator – issue 4 boards and later.

Telex decoder

THERE should be a few people like myself who are handy with a soldering iron and have TVs beyond economic repair. The notion that the UHF front-end with video demod hardware is well towards a DIY 'Telex decoder'.

Can anyone point us towards articles on decoder construction and software for the BBC Micro? – *John Howard, South Ruislip, Middlesex.*

● **It's a nice idea but unfortunately it most certainly will not work. The reason is that to get teletext reception the RF and IF circuits must have a good "eye" response.**

This means there must be little amplitude-response distortion, group delay distortion and non-linear distortion. To achieve this you need an IF filter of the surface wave type.

Older sets usually have lumped LC block filters which are difficult to coax the correct response from. Also the video demodulator needs to be a synchronous type as opposed to the more common diode type.

I have tried to use conventional tuners in the past and can confirm that they simply do not work.

As for the decoder side, Mullard Technical Information No. 72 (1978) contains a circuit that can be modified to use with a computer simply by putting data select lines on the address lines of the memory.

Then the computer can "tap in" to the teletext once it has been received. Also Wireless World and Practical TV have published circuits that could be modified.

Modems and that monopoly

NOT having had the good fortune to have read *The Micro User* for very long I am not sure of the intricacies of Body Build Packs 1, 2 and 14.

In particular I am interested in learning a little more of the acoustic modem. The description given in the September issue suggests it comes minus a handset retainer.

Can you therefore explain what importance this item has and something about Packs 1 and 2 since I would like to communicate outside the restrictions of the BBC B computer in my possession. – *Paul Newell, West Ealing, London.*

● **Pack 2 contains a ribbon cable and connectors needed to connect all Body Build projects that use the User Port. The July 1983 issue explained how to connect it up – back issues can be purchased.**

This cable will be needed to connect the modem board to your micro. The handset retainer is simply a device to hold the microphone and earphone close to the telephone and to muffle external noise. If you like you can put them against the phone, wrap it round with bandages and hold it with elastic bands.

Since writing the modem article I have been told that BT approval is needed even on acoustic couplers. It's no wonder the BT monopoly is being broken is it?

Pen problems

AT last year's Manchester Micro User Show I bought one of your light pens. To say the least it is a disappointment.

I quote from Micro User Vol 1 Number 8 page 65: "The BBC Micro, however, has built into it a 6845 CRT controller ... One of (its) ... features ... is that it allows a light pen to register the exact position it is pointing to on the screen".

My light pen seems to possess two major faults. One is that it will definitely not draw or place information at the exact position to which it is pointing and secondly, with specific reference to Pendraw – when drawing on

→

From Page 59

the extreme right of the screen it manages to change colour or shape when pointing to a position relative to the menu on the left.

While altering the menu choice on the left it does not alter it to give the correct information.

Also at times in Pendraw, the pen simply refuses to operate.

Incidentally, as an aside, would not an on/off contact in the pen barrel have been desirable – it is impossible to place something in centre screen without extraneous drawing taking place.

I look forward to receiving any advice or comments but if the pen is operating normally I can only repeat that it is a bitter disappointment and, I feel, a waste of money. – *D.M. Maris, Halifax, West Yorks.*

● I am sorry you were disappointed with the light pen you bought. I did not claim that mine was any more accurate than any other as all light pens use the 6845 CRT controller.

This has only character resolution as I explained in my article. Due to the distortion on many TV sets – especially colour TVs – there may be a discrepancy between the register reading in the 6845 and the spot position.

On some TVs this is made worse by this discrepancy not being constant across the screen. This is due entirely to the TV tube.

This accounts for both the difficulties you have using your pen. When the pen refuses to operate there is too little or too much screen brightness and so it should be turned up or down accordingly. Again the output from some colour TV tubes varies over the screen dropping off quite sharply at the edges.

To incorporate an on/off switch in the barrel of the pen would not be feasible for the numbers of pens we sell as the tooling charges would have doubled the cost.

I feel that you did not understand what a light pen was capable of and how it operates. I assure you you would have had the same feelings whatever brand you would have bought.

IF you have a technical query for this page, send it to Mike Cook, *The Micro User*, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Letters on other subjects should be sent, as usual, to Micromail, which this month starts on Page 167.

Link-up

IS it possible to link up a BBC B, Acorn DFS and an Opus single drive to the new 3incher of theirs and copy direct?

Also the 5¼in is 100k, SS,SD – the 3in is advertised as 500k, DS,DD. Would you therefore get five times as much on a 3in disc as on a 5¼in disc – if not, why not? – *John Blackshield, Riddlesden, Keighley, Yorks.*

● Yes, it is possible to do this. To the micro a 3in drive looks just like a 5in drive so you should follow the same procedure as you would when fitting a second drive.

With a 3in disc you can insert it either way up and use both sides thus doubling the capacity of data held on one disc. Note that you will not be able to access both sides at once unless you have a double headed drive.

If your DFS and disc controller does not give double density – the standard is single density – then you will not get any extra space.

5v shock

MIKE Cook's 'Body Building Course' in the September 1984 issue of *The Micro User* on the Digital Frequency Meter shows the +5 volts connected to pin 5.

Shouldn't this be pin 4? – *Frank Ryding, Hereford.*

● Yes, sorry about that. I missed it. However when you are wiring it up you would find two connections to pin 5 so that should alert you. I don't think you will do any harm to the IC if it was connected like this. Thanks for pointing it out.

Switching files to the BBC

I HAVE just bought a BBC BD after owning an unexpanded TRS 80 Model 1 Level 2.

Your article in the September issue of *The Micro User*, "The binary beacons are lit ...", states that you transferred programs from the TRS 80 to the BBC.

I would be grateful if you would provide me with further details on how to do this as I have quite a lot of data files on cassette to transfer.

I still have the TRS 80. – *A.G. Follett, Armthorpe, Doncaster.*

● To transfer files from a TRS 80 to a BBC Micro you need the TRS 80 with an expansion interface fitted with an RS232 board. You then connect this to the BBC's RS432 input and using the appropriate software dump your files across.

It would be possible to write a machine code routine to simulate serial data out of the cassette port, but then you would need some transistors and a power supply to convert this into the +– 5 volt signal needed by the RS432.

Unfortunately I have not got the time to do it myself, sorry.

THE FAST ANSWER

DO the I/O lines of the 6522 VIA float high on reset? – *Michael Ashwin.*

● Reset on the VIA causes all lines to become inputs, therefore they float high.

I BOUGHT a 14in colour TV to use with the BBC Micro. Never satisfied, I have tried to convert it to a 'monitor' with some success. I have built an interface box using some HP6N137 opto couplers but this doesn't seem to be fast enough. They are mHz devices. If I connect the signals straight through it works quite well. Even so I should like to be sure of safety so what can I do? – *Graham Martin.*

● To use an opto isolator for a high resolution video signal you need one with a bandwidth of at least 30mHz. Remember the bandwidth is the frequency at which the output has dropped by a half and 10mHz is not enough. Unfortunately I have not come across any at a sensible price that will do the job.

I HAVE recently installed an Aries B20 and B12 only to find that my Vucalc and Vufile and Replica 2 won't run with the additional memory switched in. Psion say hard luck. I wondered whether anyone out there has had the same problem and found a way round it. Failing that can anyone recommend a spreadsheet and database that will work with Aries B20? – *Jack Staff-Brett.*

● All Acorn products will work with the Aries board. If all software houses followed the rules there would be no trouble,

DOES anybody know if it is possible to somehow split the output to the TV or monitor from the BBC Micro so as to enable two monitors to be used to display the output – say one displaying a graphics window, and the other displaying a text window, neither showing the output of the other?

I fear the problem is beyond me. A candidate for the Body Building Course? – *Paul Hollyer.*

● No, this is not on at all, as the text and graphics are generated by the video output of a bit map. That is the same device responsible for both – therefore they cannot be split.

CAN anybody tell me how I can modify my Acorn DFS 0.9A eprom to use my APTL sideways RAM as work space, and of course set PAGE back to &E00 – or write a utility program to do the same function? – *Brian Moulson.*

● Solidisc do this with their sideways RAM cards. It should work with your system. Write to them and see if they will sell you the program!

TECHNOMATIC

MARCH '85

BBC Computer & Econet Referral Centre

17 Burnley Road, London NW10 1ED Tel: 01-208 1177

Please add carriage: (a) £8; (b) £2.50; (c) £1.50; (d) £1 and 15% VAT to order value

ACORN COMPUTER SYSTEMS

BBC Model B	£348(a)
BBC Model B + DFS	£395(a)
BBC Model B + Econet	£389(a)
BBC Model B + Econet + DFS	£450(a)
ACORN 10Mbyte Hard Disc	£1300(a)
BBC Dust Cover	£4(d)
BBC Carrying Case	£12.50(b)

UPGRADE KITS

A to B	£65 (d)	Installation	£20
ACORN DFS Kit	£95 (d)	Installation	£15
Econet Kit	£55 (d)	Installation	£25
Speech Kit	£47 (d)	Installation	£15
BASIC II Rom with user guide			£22.50
1.2 O/S Rom	£7.50	DNFS Rom	£17.50
4816AP Memory upgrade RAM			£2.00

ECONET ACCESSORIES

Terminator (Two reqd per installation)	£31 (c)
Clock with psu	£39 (c)
Printer Server Rom	£41 (c)
File Server Level I	£86 (c)
File Server Level II	£216 (c)
10 Station Lead Set	£26 (c)
Extra Econet cable	£1.50/m (d)
Econet User Guide	£10 (d)

ACORN BITSTICK

The renowned 'BITSTICK' graphic CAD package. Using the on-screen menu and colour pallette, it can draw freehand as well as lines and shapes with great accuracy. Any part of a drawing may be magnified many times, and up to 48 drawings may be saved on a disc. In total, a friendly yet sophisticated CAD system offering tremendous value. £325(a)

FX80 dump routine available. £35

ACORN Z80 2nd Processor

This processor converts your BBC into a complete business micro with all the computing power a professional would need. The system is CP/M based and is supplied with free software package. The package includes three office productivity programs, (memoplan, fileplan and graphplan), Systems generator program, three programming languages plus the ACCOUNTANT business program. Software is accompanied by extensive manuals that not only get you started but also answers your whys and hows.

All for only £399 (a) (incl VAT)

See our section on CP/M software for other packages available for use with this processor.

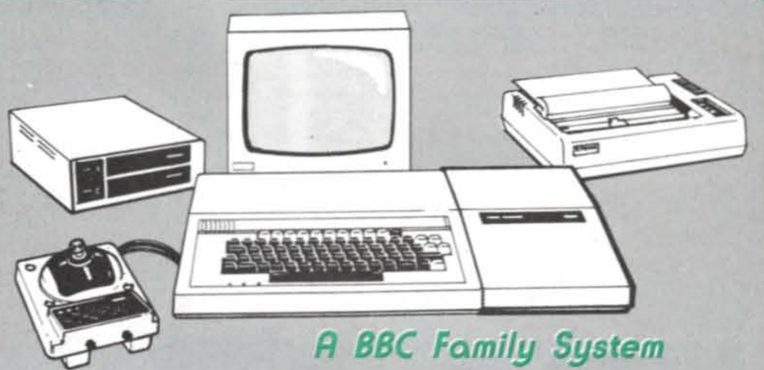
ACORN 6502 2nd Processor

This processor is designed for the serious computer user who wants to get even more out of his computer. This processor provides increased memory — allowing up to 44K for Basic programs and up to 60K for assembly language programs, regardless of screen mode in use. (ideal for VIEW). An increase in speed means that programs run up to 50% faster. The second processor/BBC combination offer computing power comparable to systems costing twice as much. £175 (a)

ACORN P-SYSTEM

NEW

The long-awaited-for portable operating system has arrived. Intended for use with the 6502 Second processor, this portable operating system is a complete implementation and comes complete with a Filer, Editor, and compilers for two languages, USCD PASCAL and FORTRAN-77. Widely used in universities and colleges, as well as being popular with business software authors, P-System is user-friendly, offering ease of program development as well as portability. £273(b)



A BBC Family System

ACORN WINCHESTER DRIVES

Acorn Hard discs are now available in 10 Mbyte and 30 Mbyte versions. The drive plugs into the 1 MHz bus. The ADFS filing system with its hierarchial filing structure provides an excellent file management facilities. Data is transferred at a rate of 1 Mbit/sec and the 'seek time' is 85 ms. Full details on request.

10 Mbyte Winchester Drive £1300(a)

30 Mbyte Winchester Drive £1999(a)

Acorn File Server Level 3: This enhanced file server allows more users on the network with better user access. £300(b)

If purchased with a Winchester Drive £200(b)

TORCH UNICORN PRODUCTS

The TORCH Unicorn system has been in the field for over two years and is now a proven Z80 system for the BBC. It gives you the potential to expand which no other system can currently offer. You can expand a single system with a 20Mb Hard Disc, have the processing power of a 32bit 68000 cpu with up to 1Mbyte of RAM and a Single/Multi-user UNIX operating System or set up a network of up to 254 machines. All these capabilities are available now. Probably the most popular upgrade is the TORCH Z80 PACK, offering an attractive 2 × 400K disc drive, a Z80 second processor with 64K RAM, and a CP/M compatible operating system. A free bonus is the easy-to-use, yet advanced PERFECT range of software including a word-processor, speller, spreadsheet and database. Z80 BBC BASIC is also included. £650(a)

TORCH GRADUATE SYSTEM

The ultimate upgrade — converts your BBC into a powerful 16 Bit business computer and makes it disc and hardware compatible with the IBM PC. With 256K RAM and single/dual drives, it simply connects through the 1MHz bus. (The disc drives can be used in both BBC and IBM mode, without requiring a disc interface.) The top-of-the-range Model G800/2 comes complete with the free Xchange range of software, and includes a full-feature word processor, a financial planner, a database and a business graphics package — all 'linkable'.

G800/2: £945(a)

Z80 Card ZEP100 with PERFECT Software Packages + Z80 Basic	£275 (a)
Z80 Disc Pack ZDP240 with software as above	£650 (a)
20Mb Hard Disc + 1 × 400K Floppy Drive	£1,950 (a)
UNICOMM Communications Package + modem	£159 (a)
Unicorn 68000, Unix OS/Z80B/256K, 20MB Hard Disc, 400K Floppy	£2995 (a)

PRINTERS

ALL PRINTERS HAVE A 12 MONTH GUARANTEE

DOT MATRIX

* Epson Compatible Control codes
* 80 or 156 Column
* NEAR LETTER QUALITY Print using 23 × 18 matrix
* Text Modes include Normal, Italic, Enlarged, Condensed, Super/Sub Script, Proportional
* Dot Addressable graphics in various modes
* 3K buffer which can also hold user defined characters
* Extra ROM/RAM socket for custom print fonts
* Friction & Tractor feed with built in paper roll holder

KP810 (80 column) **£255 (a)**
KP910 (156 column) **£359 (a)**

EPSON:

The industry standard printer offering the quality, reliability and versatility.

RX80T **£215 (a)** RX80FT **£225 (a)**
RX100 **£345 (a)** FX80 **£315 (a)** FX100 **£435 (a)**

DAISY WHEEL

BROTHER HR15: • 14 cps • 3K Buffer • Two colour printing • Proportional spacing * Underline * * Bold * Shadow print * Super/Sub script + many other features.

BROTHER HR15 **£340 (a)**

JUKI 6100: • 15 cps • 2K Buffer • Switchable 10/12/15 cpi • Proportional printing • Linear Motor for max reliability.

JUKI 6100 **£340 (a)**

ACORN VIEW PRINTER DRIVER GENERATOR

As well as coming with pre-defined drivers for printers including EPSON FX80, JUKI6100 etc, this generator enables you, by answering a few simple questions, to generate your own dedicated driver for almost any printer. The days of having to buy individual dedicated printer drivers are gone! £10(d)

EPSON HI-80 PLOTTER

NEW

This new A4 size Epson plotter has many features and commands not present on plotters costing far more. Features include: 4 pens at same time — up to 10 colours, various types of pens, high plotting speed, can produce text in normal way as well as user defined characters, text can combine with graphics etc., etc. £399(a)

GRAPHICS PLOTTER/WORK STATION

Equally at home in the artists studio, hobbyists workshop, science lab or a classroom, this system has something to offer for everyone. The 3 colour graphics plotter provides both precision and versatility. The carriage can be moved with an accuracy of 0.025cm over an A4 area — the plotter being able to accept paper and far thicker materials at sizes of up to A3. The basic plotter carries 3 colour pens each of which is software selectable. Additional accessories greatly enhance the versatility of the unit without losing the accuracy. The servo controlled drill/router, and scriber can be used on various materials. A unique Opto Sensor (using a Hewlett Packard device) turns the plotter into a high-res scanning digitiser to read & store whole diagrams and photographs. Workstation comes complete all accessories.

Workstation Complete **£490(a)**

Basic Plotter **£270(a)** Opto Sensor **£72(c)**
Drill/Router Attachment **£79(c)**
Power Supply: PS12V **£42(c)** PS24V **£78(c)**
Scandump Utility Disc **£14.95(d)**

TECHNOMATIC

All prices exclude VAT

PRINTER ACCESSORIES

NEW

EPSON
32K Internal Buffer Parallel £75(b)
Paper Roll Holder £17(d) FX80 Tractor Attachment £37(c).
Interfaces: 8143 RS232 £28(c); 8148 RS232 + 2K £57(c);
8132 Apple II £60(c); 8165 IEEE + Cable £65(c).
Serial & Parallel Interfaces with larger buffers available.
Ribbons: RX/FX/MX80 £5.00(d); RX/FX/MX 100 £10(d);
FX80 Dustcover £4.50(d)

KAGA TAXAN: RS 232 Interface + 2K buffer £65(c); Ribbon KP810/910 £6(d)

JUKI: RS232 Interface £65(c); Spare Daisy Wheel £14(d); Ribbon £2.50(d);
Sheet Feeder £129(a) Tractor Feed Attach £129(a)

BROTHER HR15: Sheet Feeder £199(a); **Ribbons Carbon or Nylon** £4.50(a)

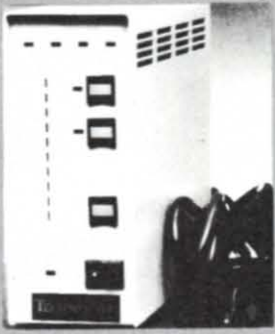
BBC Printer Lead: Parallel (42") £7(d); Serial £7(d)
Printer Leads can be supplied to any other length.

Plain Fanfold Paper with extra fine perforation (Clean Edge):
2000 sheets 9.5" × 11" £13(b) 2000 sheets 14.5" × 11" £18.50(b)
Labels: 3½" × 1-7/16" in quantities of 1000
Single Row: £5.25/1000 (d); Triple Row: £5.00/1000 (d)

PRINTER SHARER/BUFFER

A unique sharer/buffer that provides a simple solution to improve system utilisation. it can be connected to up to three computers and it will automatically switch between the computers to scan for data — no manual switching required. High speed data input rate to the buffer cuts down the normal waiting time for the computers for the printing operation to complete and thus allowing the computers to be used for other uses. In networked systems it can eliminate the printer server unit. The 64K buffer would hold over 30 A4 pages of text.

Facilities include: COPY, PAUSE AND RESET. LED indication for percentage of memory available and data source. Mains powered. Send for detailed specification.



TSB 64 Buffer/Sharer **£245(a)**
Cable Set **£30**

PERIPHERAL & COMPUTER SHARERS

We now offer an extended range of peripheral sharers to allow the user to switch between computers, printers and modems. High quality switching mechanisms housed in fully shielded metal cases ensure reliability. No power required.

Three Computers to one centronics printer (all 36 lines switched) £65(b)
Four Computers to one centronics printer (all 36 lines switched) £79(b)
Three Computers to one serial printer/modem (all 25 lines switched) £59(b)
Four Computers to one serial printer/modem £69(b)
BBC Cable Sets 3 way £22(c) 4 way £27.50(c)

Computer Sharer:
Allows one computer to be connected to two parallel printers fitted with cable for the BBC computer £19.50(b).

GRAFPAD

A low cost graphic tablet offering the performance & durability required by industrial and educational users. It is compact, accurate & reliable; working area 240 × 192mm + menu area. Comes complete with a CAD package. £110(b).

01-208 1177

Please add carriage: (a) £8; (b) £2.50; (c) £1.50; (d) £1 and VAT at 15% to order. Carriage (a) sent by Datapost

MONITORS

All monitors supplied with BBC lead

MICROVITEC

All 14" monitors now available in plastic or metal cases, please specify your requirement.

14" RGB		with PAL & Audio	
1431 Std Res	£165(a)	1431 AP Std Res	£210(a)
1451 Med Res	£240(a)	1451 AP Med Res	£280(a)
1441 Hi Res	£399(a)	These monitors can receive TV programs thru a Video Recorder	
20" RGB		**with PAL & Audio**	
2031 Std Res	£260(a)	2030CS Std Res	£380(a)
2040CS Hi Res	£570(a)	2040CS Hi Res	£685(a)

KAGA TAXAN 12" RGB

VISION II Hi Res £235(a) VISION III Super Hi Res £340(a)

SANYO CD3125NB 14" RGB Std Res £179(a)

MONOCHROME MONITORS:

SANYO DM8112CX Hi Res 12" Green Screen	£90(a)
KAGA KX1201G Hi Res 12" Etched Green Screen	£99(a)
KAGA KX1202A Hi Res 12" Etched Amber Screen	£105(a)
ZENITH 123 Hi Res 12" Green Screen	£68(a)
ZENITH 122 Hi Res 12" Amber Screen	£68(a)
Swivel Base for Kaga Monochrome fitted with Digital Clock	£21(c)
Monitor Plinth for the BBC	£13.50(b)
Double Tier Plinth for BBC and flat pack dual drive	£19.50(b)

BBC Leads Kaga RGB £5(d) Microvitec £3.50(d) Monochrome £3.50(d)

RB2 TRACKER BALL

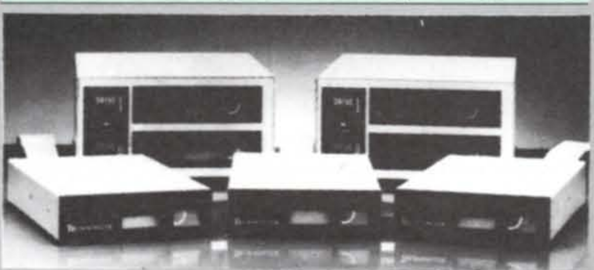
RB2
Marconi

Marconi with its years of experience making tracker balls for use in Military and Air Traffic Control have developed a quality device for the serious hobbyist, for educational uses, and for low cost CAD/CAM applications. RB2 is a compact, ergonomically designed tracker ball that provides precise positional control and rapid direction changing using a freely rotating resin ball in any direction without the limiting stops or the zero point drift of joystick controls. Three switch buttons enable easy software manipulation to incporate the use of the tracker ball. Appropriate software will enable the RB2 to take over the functions of cursor keys in word processing, CAD/CAM applications and two dimensional positional controls of robots, drillheads etc. RB2 which plugs into the user port is supplied with utility programme to use it as a joystick with other software, a comprehensive graphics/CAD program and a program demonstrating its editing capabilities. User guide includes instructions on writing your own programs for the RB2. £52(b)

AMX MOUSE – As seen on the BBC TV Micro progam

In conjunction with a controlling ROM this sophisticated mouse has many advanced features such as Icons, Windows etc., these can be used in ordinary programs as well as sophisticated CAD Design. The supplied 'AMX ART' is a superb, yet simple-to-use CAD package allowing the creation of amazing graphical designs. A screendump for drawings is included. It can also be used with Wordwise/View to replace the cursor keys. Supplied complete with CAD Package, ROM and full instruction manual. £75(b)

DISC DRIVES



TECHNOMATIC disc drives come fitted with high quality slimline Japanese mechanisms and represent the state of art in disc drive technology. They are built to highest standards and are all tested to their full performance capability before packaging. Single drives are offered with or without integral power supply whilst the dual drives are supplied with generously rated switch mode power supply. Attractively designed steel casings are painted in hard wearing BBC matching paint. All drives can operate in single and double density modes. Drives are supplied with cables, manual and formatting disc and are ready to be fitted to the computer.

Single Drives

1 × 100K 40T SS	: TS55A £100(b);	CS55A with psu £125(b)
1 × 200K 40/80TSS	: TS55E £140(b);	CS55E with psu £150(b)
1 × 200K 40TDS	£115(a)	
1 × 400K 40/80TDS	: TS55F £145(a);	CS55F with psu £169(b)

Dual Drives

2 × 100K 40T SS: TD55A with psu £250(a)
2 × 200K 40/80T SS: TD55E with psu £325(a)
2 × 400K 40/80T DS: TD55M with psu £350(a).
2 × 400K 40/80T DS: TD55MP in flat pack with built-in plinth £365(a)

DISC DRIVE MULTIPLEXER

A simple device that enables up to four computers to be connected to one single or dual drive. Ideal unit for installing in classrooms where networking is not planned or necessary or the costs have to be kept low or where software information is shared. Several of these units can be installed in series to connect more computers to access the same discs. Units supplied with 5' of cable per outlet as standard. Mains powered.
Write for full details.
TDM 4 Quad Unit (upto 4 computers) £135(a)
TDM 2 Dual Unit (2 computers) £75(b)

Note: All computers must be fitted with a DFS

3M FLOPPY DISCS

3M
DISKS
£1 Voucher for every 10 discs purchased until voucher stocks last

Authorised Distributor
Data Recording Products

Industry standard high quality discs with guaranteed error free performance for life. £1 Wine Voucher with purchases of every 20 discs only until voucher stocks last.

Discs in packs of 10:

40T SSDD **£15(c)**	40 T DSDD **£18(c)**
80 T SSDD **£22(c)**	80 T DSDD **£24(c)**

DISC ACCESSORIES

Single Disc Cable £6(d) Dual Disc Cable £8.50(d)
10 Disc Library Case £1.80(d) 30 Disc Case £6.00(c)
Lockable Storage Boxes 30/40 Discs £14(c) 100 Discs £19(c)

The FLOPPICLENE disc head cleaning kit is the ideal way to ensure the optimum performance of your drives. The use of disposable cleaning discs eliminate the risk of recontamination and abrasion of the sensitive disc heads and ensure continuously reliable data capture and transmission.
Floppiclene with 20 disposable cleaning discs. £14.50(b).

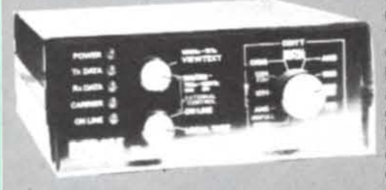
COMMUNICATIONS

MODEMS

ACORN PRESTEL: The official Acorn add-on — an advanced BT Approved. Auto-Dial, Prestel Terminal ideal for British Telecom Gold. Comprehensive software includes 'tagged' frames, downloading of Telesoftware, saving of frames, printing, sophisticated 'Mailbox' handling c/w editor. A built-in speaker allows line monitoring. A simple !BOOT file allows automatic operation £106(b)

BUZZ BOX **A full spec, BT approved, pocket size, direct connect modem with both originate & answer modes, full & half duplex, allowing access to many databases, bulletin-boards as well as Intercomputer communications. It conforms to CCITT V21 300/300** Baud Standard. Battery/mains powered £55(c) BBC Lead £6 External PSU £9(c)

MINOR MIRACLES WS2000 A world standard modem, having BT approval, covering V21,V23,BELL 103/113/108 and including 75,300,600,1200 Baud ratings. (It even includes 'reverse Prestel'!). This is the modem that will cover 'Prestel' type systems as well as Bulletin Boards both in the UK and abroad. What possibly gives this modem its biggest advantage is its option of computer control. A 25Way RS232 input as well as possible computer controlled auto-dial/auto-answer makes this modem unique. WS2000 £129(c) BBC Serial Cable £7



WS2000 Auto-Dial card: includes an integral loudspeaker for monitoring of the phone line £30(d). BBC User Port cable (for modem control) £7. **SKI KIT** (Allowing total control of the modem by your computer) £10. **DS1 Disc (for Commstar):** When used with the Auto-dial card, SK1 Kit, and a user port cable, this software will dial out to Prestel, enter your password etc. and leave you in Commstar. Will also store many bulletin board telephone numbers for autodialling £10.

WS2000 Auto-Answer Card £30(d).

UNICOM A High Performance, yet low-cost Modem. Features include: Auto-dial & auto-answer, Auto baud rate scan, 75,300,1200 Baud rates with V21, V23 and Bell standards. Sophisticated software in ROM allow many features like: Auto-Dial. Redial, Remote facilities etc. An Auto-Dial disc allows storage of commonly dialled numbers. UNICOM £49.95(b) Unicom ROM £20 Unicom Disc £9.95 Unicom Cable £6(d) Not BT approved

TELEMOD-2 A BT approved modem complying with CCITT V23 1200/75 Duplex & 1200/1200 Half-Duplex standard, that allows communication with Viewdate services e.g. Prestel, Micronet etc., as well as using 1200 Baud for communicating with other computer users. Mains powered. TELEMOD 2 £50(b) BBC Lead £7.00

COMMSTAR An ideal communications Rom. Extremely easy to use, yet very versatile. It features both a Prestel mode as well as a Terminal mode, thus offering very good value for money. In Prestel mode, all normal Prestel features are available including, downloading of software, saving and retrieving of pages on disc, page tag, revealing of hidden text etc. Its terminal mode is ideal for bulletin boards etc. All input may be copied into a buffer in memory over which full control is available. Controls of protocols are very simple and any type of file, (not just ASCII) may be sent using XModem protocols. Even includes an elapsed time-clock. £29(d)

TERMI-II A good all round package for communicating with notice boards, electronic mail services etc. Termi is a semi-intelligent terminal emulator allowing the BBC to act as a dumb terminal, slave BBC graphics terminal, or VT52 terminal. The rates at which data is sent or received is easily set up with rates of up to 4800 Baud with 40/80 col. selectable. Allows files to be transmitted from disc, or a copy of incoming data to be sent to a file or to a printer. (Termi is not suitable for PRESTEL). £28(d)

COMMUNICATOR This is a full 80 col VT100 terminal emulation program on 16K eprom. It is a more advanced program than TERMI and features easy to follow screen menus. The rate at which data is sent or received is easily set up with rates up to 19200 Baud with 80 column text. Allows files to be transmitted from disc, or a copy of incoming data to be sent to a file or to a printer. (Communicator is not suitable for PRESTEL). £59(d).

TECHNOMATIC

All prices exclude VAT

EPROMER II

EPROMER II
Technomatic Ltd

This enhanced eprom programmer will handle the full range of popular single rail eproms. Its sophisticated menu driven software makes the programming of eproms simple and efficient. Features included in this programmer are normally found in industrial grade programmers costing many times more.

- Interfaces with the BBC through 1 Mhz bus. Fully buffered and complies with the ACORN protocols. Integral power supply ensures no power drain from the computer.
- All eproms up to 16K programmable in single pass.
- User friendly software driven menu provides total control from the keyboard — no knobs to fiddle with.
- Selectable programming voltage — 25/21/12.5V.
- Defaults to normal programming — high speed algorithmic programming selectable.
- READ/BLANK CHECK/PROGRAM/VERIFY at any address or addresses.
- Constant display of all options selected.
- Full screen editor with HEX/ASCII input — Full TAPE/DISC filing facility.
- Data entry from the keyboard, disc/tape or another eprom.
- Several BBC BASIC programs can be entered on one eprom.

EPROMER II with manual & cassette £99(b) Software on: Disc £3

UV ERASERS

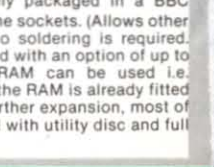
UVT1T Eraser with built-in timer and mains indicator. Built-in safety interlock to avoid accidental exposure to the harmful UV rays. It can handle up to 5 eproms at a time with an average erasing time of about 20 mins. £59(b).
UV1 as above but without the timer. £47(b).
For Industrial Users, we offer UV140 and UV141 erasers with handling capacity of 14 eproms. UV141 has a built in timer. Both offer full built in safety features UV140 £61; UV141 £79(b).

SMARTMOUTH

The original 'Infinite Speech' Synthesiser — Still the best around!! A ready built, self contained speech synthesiser unit, attractively packaged with built in speaker. Tailored frequency response audio stages for optimum sound quality. Any word can be easily created — very economical with memory. Plugs into the user port — no roms required. Demo and development programs supplied on cassette (easily transferred to disc) £31(c)

'TIME-WARP' REAL-TIME CLOCK CALENDER

We have broken the price barrier! A low cost unit, allowing the facilities of units costing far more. Built to professional standards, it opens up the total spectrum of Real-Time applications. Possibilities include desk diary/planner, calender, continuous display of on-screen time and date information, automatic document dating, precise timing and control in scientific applications — its uses are endless. Simply plugs into the user port — battery backup is supplied as standard. A full manual as well as Extensive software on cassette (easily transferred to disc) — no ROMs needed. £29(c)



RAMROM-15

The advanced sideways ROM/RAM expansion system. This is an external unit, using high quality construction, attractively packaged in a BBC coloured metal case, allowing easy access to all the sockets. (Allows other units to be fitted inside the BBC). Absolutely no soldering is required. Allows 11/12 additional sideways ROMs to be fitted with an option of up to 16K sideways RAM. All commonly available RAM can be used i.e. 4801/6116/6264 or xx128. All the hardware to take the RAM is already fitted e.g. battery backup. For development work and further expansion, most of the 6502 processor signals are available. Supplied with utility disc and full instruction manual. £112(b)

01-208 1177

Please add carriage: (a) £8; (b) £2.50; (c) £1.50; (d) £1 and VAT at 15% to order. Carriage (a) sent by Datapost

ATPL SIDEWISE ROM EXPANSION BOARD

This is a well constructed expansion board that does not require soldering in its installation. All buses are buffered. It allows full sideways Rom expansion to a total of 16 ROMs. One socket has been split into two 8K sockets to allow the use of 8K byte CMOS RAM chips, giving a total of 16K sideways RAM. This is ideal for sideways rom development, and will also allow downloading of software from cassette or disc. The battery backup option will allow retention of data in the RAM, when power to the computer is removed. Several link-selectable options include the choice of type of Eprom, and a 'write-protect' for the RAM option. £39(d) Back-up Kit £18.

ACORN IEEE INTERFACE

This interface enables a BBC computer to control any scientific and technical equipment that conforms to the IEEE488 standard, at a lower price than other systems, but without sacrificing any aspect of the standard. The interface can link up to 14 separate IEEE compatible devices. Typical applications are in experimental work in academic and industrial laboratories, with the advantage of speed, accuracy and repeatability. The interface is mains powered and comes with cables, IEEEFS ROM, and user guide. £282(a)

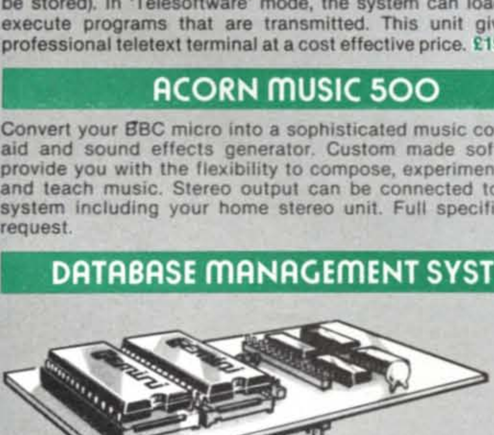
ACORN TELETEXT INTERFACE

This interface allows the retrieval and storage of data transmitted by both BBC and IBA. There are currently many educational and other programs being transmitted, and this unit will allow their retrieval absolutely free. In 'Terminal' mode, the system receives and decodes pages from both Ceefax and Oracle. (These pages can be stored). In 'Telesoftware' mode, the system can load, run and execute programs that are transmitted. This unit gives you a professional teletext terminal at a cost effective price. £195(b)

ACORN MUSIC 500

Convert your BBC micro into a sophisticated music composition aid and sound effects generator. Custom made software will provide you with the flexibility to compose, experiment, perform and teach music. Stereo output can be connected to a sound system including your home stereo unit. Full specification on request. £174(a)

DATABASE MANAGEMENT SYSTEM



GEmini DATAGEM

The Definitive Random Access, 24K ROM Based DATABASE MANAGEMENT SYSTEM.
Datagem is the first truly flexible database for the BBC Micro that can make your system really useful and efficient, saving you money in the long run. The system includes a carrier board containing two Eproms, demonstration applications disc in both 40/80T, professional documentation with quick reference card, and 'Trans' utility program. Features include: *almost unlimited file size (max 10MByte) *supports up to 4 drives *Max of 5000 records per file *max 6K record size *max of 62 fields *9 level hierarchical search system with facilities to store results of searches. Searches can be any one of the following: Search, Include, Exclude, Combine, Common or Difference *user defined variables *generates form letters from records. Please ask for leaflet. £112(c).

STARdataBASE A fast machine code, true random access database program in a 16K Eprom. Up to 4096 records in a file, up to 69 fields in a record. The record layout is totally user defined. Entirely menu driven — thus very user friendly. Extremely fast searches are possible using the Keysearch facility. Mailmerging from View and Wordwise, and address labelling. Its printer configuration suits any BBC compatible printer. £75(d)

ROMs/SOFTWARE

VIEW Acorn's new version V2.1 word processor rom. Advantages include printing straight from memory and editing in any mode. £48(c)

HI VIEW Disc based version of VIEW word processor for use with the 6502 2nd processor. Allows 47K of user memory. £52(c)

VIEW INDEX Disc based program to create an index from VIEW text files. Ideal for anyone concerned with writing extensive reports or books. £13(d)

WORDWISE One of the most popular word processors for general use £34(d). Wordwise SpellCheck Disc — A must for any serious word processor user. Normal price £16.50(d). If bought with Wordwise: No p&p and only £14.

WORDWISE PLUS The new advanced Wordwise on a 16K eprom, for the more specialised users who require added features and flexibility. New facilities include: 2nd Processor compatible allowing 80 column previewing in all cases, a new Basic-like language, new editing features and embedded commands etc etc. Four new programs are also supplied allowing mail-merging, index generating, two-column text printout and continuous processing. A new 56 page introductory manual and a 180 page reference manual complete this rather special package. Finally, it is able to use existing Wordwise files without any modification. £49(d).

SPELLCHECK II: A rom based fast machine code program that works with both VIEW and WORDWISE. Vocabulary disc supplied with 6000 words can be expanded to well over 17000 words on 100K drive. Fully compatible with 6502 second processor. £26(d)

ISO-PASCAL: Acorn's full implementation of International Standard Pascal on two 16K ROMs. Disc Version for use on 6502 2nd Processor also supplied. Comprehensive manual. £60(c)

ACORN LOGO A full implementation of the Logo language from Acornsoft. Supplied as two ROMs with a tutorial course and technical manual. £60(b)

ULTRACALC This enhanced version of the original BBC Publications popular spreadsheet rom includes many new features including full compatability with the 6502 2nd processor running as HiCalc allowing 44K of user memory, operate in any mode, greater flexibility in printer control, spooling as ASCII file etc. All these features are in addition to the existing powerful features such as handling of labels and numbers as values. Column width control and features normality found in well designed spreadsheets. £69(d)

VIEWSHEET Acorn's spreadsheet provides 255 columns and 255 rows and will operate in any mode. Windows can be created which can then be rearranged to provide any print format required. Function keys provide for easy entry of commands. Printer control codes can be used using the printer driver. Fully compatible with VIEW and the 6502 2nd Processor. £52(d)

BCPL A full implementation of the BCPL compiler language consisting of the language rom, disc containing the BCPL compiler, a screen editor, a 6502 assembler, other utilities and programming aids and examples of BCPL code and a 450 page manual. BCPL can be used to develop games programs, commercial packages, system software, to write control systems and to produce programs which otherwise would need to be written in assembler. £52(b)

BCPL STAND ALONE GENERATOR Utilities in this package enable the programs developed using the BCPL rom to be converted so that they can be run on any BBC micro whether it has a BCPL rom or not. Stand alone programs for other 6502 based systems can also be developed. £43(d)

BCPL CALCULATIONS PACKAGE: supplied on disc, it supports floating point, fixed point and fast integer calculations. It includes the BCPL calculation files, example files and a comprehensive user guide. £17.30(b)

ACORN LISP Rom £43(d)

G:FORTH An advanced implementation of FORTH which follows the 79-Standard specification on a 16K ROM and has a full double number extension set. It incorporates an editor, 6502 assembler, very fast turtle graphics and supports extensive string and file handling. It contains 540 predefined words including those for reading joystick ports, produce sounds, set and read the time and produce random numbers. Fully compatible with disc or tape filing systems and works in any mode. Package comes complete with a USER GUIDE, Introduction to FORTH and 16K GFORTH ROM £43(d)

DISC DOCTOR Computer Concept's popular disc utility rom which adds 20 commands to the DFS system. £27(d)

DISCMASTER Beebug's a disc utility rom which provides additional DFS commands and utilities including disc menu to automatically RUN/*RUN programs, converting 40 track discs to 80 track and enable dual catalog. £16(d)

EXMON II Updated version of the EXMON rom with facilities including dual screen operation and full screen memory editor. £24(d)

TOOLKIT This ROM adds 27 new commands to the BBC BASIC. These include a full screen editor, merge, relocating data in memory, program compactor, listing of variables and memory search. £23(d).

SLEUTH A debugging tool for BASIC programs which includes features like single stepping of dual screen programs, and accelerator to run programs from full speed to freeze frames. £24(d)

GRAPHICS ROM Adds 28 new graphic related commands and features include sprites, turtle graphics, rotation, scaling, 3D plotting all using" * " commands. £27(d)

PRINTMASTER This ROM features the most versatile screen dump for EPSON MX/RX/FX80 and Kaga 810 printers. It supports three types of dumps. The first allows any graphics on the screen to be dumped. Colours appear as shades of grey. Any part of the screen can be printed at any position on the paper in any one of four orientations. The screen dump may be magnified by any factor x2, x3, x4 etc. A special feature allows true MODE 7 screen dumps with TELETEXT text & graphics. The second dump allows any text to be dumped whilst the third dump will print the contents of a file on disc whilst the computer is doing other things. This is not all. All printer functions can be called up using the *command. *DEFINE allows the printer to define his own characters and store them. *GPRINT allows printing of enlarged text in any position, orientation, size & shade. *WINDOW allows windows to be defined in any size and position on the screen. Can allow you to do printing as background oepration while the computer does other jobs. **In short this one ROM does it all.** £28(d)

DUMPMASTER Disc based program that produces fast machine code routines for a variety of printers incl. EPSON MX/FX, STAR 910, Seikosha, NEC PC8023, INTEGREX 132A. Dumps in 8 shades in any mode including teletext mode. Snapshot facility allows dumps from games and other programs. £10(d)

MUROM Sound Extension Rom: Helps you create your own tunes and sound sequences either with MUROM's editor and a musical score or using the keyboard to simulate a piano. Edit your creations with the full screen music editor and then switch to envelope editor to tailor the tonal quality and select instrument type. Incorporate the music into other programs or playback with or without MUROM. Instant sound effects can be called from Basic eg *ZAP, *SIREN, *EXPLODE etc. £24(d)

BILLBOARD A useful program that enables your BBC to produce super-large 'Billboard' type characters i.e. a continuous horizontal scrolling of super-large characters. Supplied in ROM. £16.50(d).

HELP Rom based comprehensive on screen HELP facility to aid and speed up programming. £21(d)

Write for details on specification and availability of the following packages expected to be released shortly:

Basic Compiler **Comal** **6502 Development Package**

MICROTEXT This authoring system developed by the NPL allows production of a wide range of man-computer dialogues. User can draw up a frame made up of text/graphics and combine a series of frames to create modules which are incorporated into a program. An expert in any field can create complete courses of computer based instruction material. Applications include interviewing systems, teaching packages, training courses and interactive demonstrations and simulations. Disc £53(b) Cassette £43(b)

REPLICA II 40 & 80 Track Versions available. £10.35(d)

BROM — the new utility ROM from Clares — a Toolkit ROM that gives you full screen editing. Many extra functions are included. £30(d).

DESIGN Design is a second processor which allows information to be displayed in a format suitable for demonstrations, slide projections, handouts or presentations. Graphs, Pie Charts & Bar Charts are quickly produced; automatically drawn & scaled. Versatile labelling facility, 25 User defined, 4 large macro characters plus screen dump facilities included. £16.50(d) Disc (80 or 40 Track).

SUPERPLOT Superplot is ideal for screen representations of mathematical functions. It will plot on automatically scaled axes, in Cartesian, Polar or Parametric co-ordinate systems and will allow overlapping of graphs. **Cass** £8.50(d).

CP/M SOFTWARE FOR TORCH Z80 ACORN Z80 PROCESSOR

We can now supply almost any CP/M based software package in a format suitable for the Torch Z80 and Acorn Z80 second processors. The following are generally available from stock.

DBASE II £335(a) **WORDSTAR PROFESSIONAL £380(a)**

WORDSTAR £275(a) **DBASE II Tutorial..... £32(c)**

PROPASCAL £220(a) **Supercalc 2 £200(c)**

Phone for your specific requirements.

Please specify the type of format (TORCH or ACORN) required.

SPELLCHECK I Menu driven spelling checker for Wordwise or VIEW. Dictionary contains 6000 words and is expandable to 1700 on 100K disc. £16.50(d) Disc (80 or 40 Track) Specify whether Wordwise or VIEW.

MASTERFILE II The new version of the popular general purpose file management system. It allows large amounts of information to be stored and processed. It is extremely powerful yet flexible to use. The disc version allows up to 17 fields per record, and the only limitation as to the number of records is the capacity of the disc. Typically, using 5 fields, about 2000 records may be stored on a 100K disc. This latest version features many new facilities including use with WORDWISE/VIEW £16.50(d) Disc (80 or 40T).

HERSHEY CHARACTER font generator: Disc based menu driven package with 1500 new characters made up from 9 different Hershey character fonts. Flexible utility allows choosing of any characters and appending them to users programs. Screen dump routine for Epson printers included. £12.50(d).

When ordering software on disc plese specify track format (40/80)

BOOKS

(No VAT p&p £1.50 per book)

CPU/Assembly Language Books	
6502 Applications	£12.50
6502 Assy Lang Prog	£17.50
6502 M/C for Beginners	£ 5.95
6502 Advanced Programming	£11.95
6502 Programming	£13.95
6800 Prog Reference Manual	£ 9.00
6809 Assy Lang Programming	£13.45
6809 Programming	£12.95
LANGUAGES	
CP/M Handbook	£12.50
Mastering the CP/M	£14.95
FORTRAN Cookbook	£ 8.00
Introduction to PASCAL	£14.95
Prog the Micro with PASCAL	£ 8.50
From BASIC to PASCAL	£ 9.00
The UNIX Book	£12.50
BBC Micro Books	
Books for Beginners:	
Let Your BBC Teach U to Prog	£ 2.50
BASIC programming on the BBC — Cryer	£ 5.50
BBC BASIC	£ 5.50
BBC BASIC for Beginners	£ 6.25
BBC Micro for Beginners	£ 6.25
Easy Prog for the BBC Micro	£ 5.00
Friendly Computer Book	£ 3.50
Gateway to Computing BBC1	£ 4.95
Gateway to Computing BBC2	£ 4.95
Getting More from Your BBC & Electron	£ 5.95
Introducing the BBC Micro	£ 4.50
Step by Step Programming 1	£ 5.95
Step by Step Programming 2	£ 5.95
Languages/Programming	
30 Hour BASIC	£ 6.75
Advanced User Guide	£12.50
Adv BASIC Rom User Guide	£ 7.50
Advanced M/C Tech for BBC	£ 7.50
Advanced Prog Tech for BBC	£ 8.50
Assembly Lang Prog for BBC	£ 7.95
Assembly Lang Prog 2nd Ed — Birnbaum	£ 8.75
Applied Assembly Lang on BBC	£ 7.95
BASIC Rom User Guide	£ 9.95
BASIC II Rom User Guide Acorn	£ 4.00
BBC Micro Revealed	£ 2.00
BCPL User Manual Acorn	£15.00
Beyond BASIC BBC Publ	£10.00
Creative Assembler on BBC	£ 5.95
Discovering BBC M/C	£ 6.00
Expert Guide James	£ 6.50
Exploiting BBC BASIC	£ 6.95
FORTH Acorn	£ 7.50
Further Programming for BBC	£ 5.50
LISP Acorn	£ 7.50
Programming the BBC	£ 6.50
Structured Programming	£ 6.50
S-PASCAL Acorn	£ 7.50
Using BBC BASIC	£10.00
SOUND & GRAPHICS:	
Advanced Graphics with BBC	£ 7.50
BBC Graphics & Sound	£ 7.50
BBC Micro BASIC, Sound & Graphics	£ 7.50
Creative Graphics Acorn	£ 7.50
Graphics on the BBC Micro	£ 6.00
Turtle Graphics	£ 7.50
EDUCATIONAL:	
35 Educational Programs	£ 6.00
BBC Micro in Education	£ 6.50
Prog for Education (Pri.Sch)	£ 5.95
DISC DRIVE SYSTEMS:	
BBC Micro Disc Companion	£ 7.95
Disc Book	£ 3.50
Disc Programming Techniques	£ 6.95
Disc Systems	£ 6.95
Using Floppy Discs	£ 6.95
APPLICATIONS:	
BBC Software Projects	£ 6.95
Business Programming on BBC	£ 7.95
Business Applications on BBC	£ 7.95
DIY Robotics & Sensors	£ 6.95
Essential Maths BBC/Electron	£ 6.95
Exploring Music with BBC & Electron	£ 9.95
Graphs & Charts Acorn	£ 7.50
Interfacing Projects for BBC	£ 6.95
Making Music on the BBC	£ 5.50
GAMES:	
21 Games for the BBC Micro	£ 5.00
100 Programs for the BBC	£ 6.00
Creating Adventure Programs	£ 5.00
Instant Arcade Games	£ 2.95
BBC User Guide Acorn	£15.00
MISCELLANEOUS BOOKS:	
6522 VIA Book	£ 4.50

EPROMS: 8K 2764-25 £5.00(d); 2764-30 £4.90
16K 27128-25 £15.00(d); 16K 27128-30 £14.00(d)
RAM: 8K standard power 6264-15 £22.00
8K lower power 6264 LP-15 £25.00

TECHNOMATIC LTD

MAIL ORDERS TO: 17 Burnley Road, London NW10 1ED
(Tel: 01-208 1177 Telex 922800)
SHOPS AT: NW London: 15 Burnley Road, London NW10 1ED
(Dollis Hill 2 mins walk, ample car parking space)
West End: 305 Edgware Road, London W2. Tel: 01-723 0233
(Near Edgware Road ⊖)

01-208 1177

All prices exclude VAT. Please add carriage (a) £8
(b) £2.50 (c) £1.50 (d) £1.00
and 15% VAT to order value
Carriage (a) by Datapost.
For fast delivery telephone your order quoting
VISA or Access card or official order number.
(Minimum telephone order £5)

ORDERS FROM GOVERNMENT ESTABLISHMENTS, UNIVERSITIES, COLLEGES, STATE SCHOOLS, HOSPITALS, NATIONALLY RECOGNISED PLCs WELCOME.

MICROWORLD

COMPUTER GROUP

COMPUTERS

Acorn Electron Standard ALA01 with 5 Pack	189.00
Acorn Electron Yorkshire TV Pack	215.00
BBC Model B with free software	369.00
BBC Model B with DFS	449.00
BBC Model B with DFS/MW 200 drive	559.00
Spectrum 48k by Sinclair with 6 pack	129.95
Disc Drive interface for Model B	125.00
Amstrad CPC 464 with Colour Monitor	339.00
Amstrad CPC 464 with Green Monitor	229.00
Apricot F1 with Free Yangyen Monitor	995.00
Apricot Fle with Free Yangyen Monitor	895.00
Sanyo DR101 Cassette Recorder	39.95
Acorn Electron Business Pack with view/view sheet	279.00

DISK DRIVES

Cumana CSX 100 40T single, no psu.(100k)	109.95
Cumana CSX 200 80T single, no psu.(200k)	149.95
Cumana CSX 400 80T single, no psu.(400k)	179.95
Cumana CS 100 40T single, with psu.(100k)	149.95
Cumana CS 200 80T single, with psu.(200k)	189.00
Cumana CS 400 80T single, with psu.(400k)	199.95
Cumana CD 200 40T dual with psu.(200k)	269.00
Cumana CD 400 80T dual with psu.(400k)	315.00
Cumana CD 400/S 40/80T switched, dual, psu.(400k)	355.00
Cumana CD 800/S 40/80T switched, dual, psu.(800k)	390.00
Disc interface kit, unfitted with DNFS ROM	89.00
Disc interface kit, fitted with DNFS ROM	117.00
Torch 280 disc pack, with perfect software and Z80	699.00
Pace 40/80 Track switchable 800k dual, no psu only	335.00
AMS 3" Hitachi 100k special offer	109.00
AMS 3" Hitachi dual 200k special offer	199.00
Box 40 Track Parrot discs super quality with plastic box	16.00
Box 80 Track Parrot discs super quality with plastic box	25.95
Sony 3.5" Single sided discs	38.00
Sony 3.5" Double sided discs	48.00

(All disc drives supplied come with manual, format disc and all necessary cables etc.)

SUNDRIES

AMS Mouse—superb with full software only	89.95
Marconi Trackerball—excellent, includes software	59.95
British Micro Grafpad	140.00
Wordwise ROM	39.95

APRICOT F1 SOFTWARE

Sage Sales/Purchase/Nominal/Stock/Invoicing	425.00
As above but including Payroll	495.00
Dbase II	495.00
Wordstar	325.00

BRANCHES THROUGHOUT SCOTLAND
Aberdeen
Glasgow
Edinburgh

HOW TO ORDER:

ORDERS by post welcomed; please detach coupon and mail with payment.

Telephone orders welcome call 031-228 1111 or 031-228 1261.

We also welcome Government and Educational orders.

All products supplied include our own 12 months guarantee backed by our own service centre staffed by fully qualified engineers.

Order with confidence, 7 days money back guarantee.

All charges include VAT and carriage charges by courier.

PRINTERS

Epson RX80 matrix dot	259.00
Epson RX80 F/T matrix dot	279.00
Epson FX80 matrix dot	379.00
Epson FX100 matrix dot	599.00
Epson LQ 1500 matrix dot	1250.00
Epson DX 100 Daisywheel	435.00
Epson DX100 Keyboard	189.00
Epson DX100 Sheet feeder	245.00
Epson Serial I/F with 2K buffer (8145)	69.00
Printer cable for any printer (1m)	15.00
Printer cable (1.5m)	17.50
MCP40 printer/plotter	119.95
Canon 1080A NLQ (80 Col)	319.00
Canon 1058A NLQ (132 Col)	449.00
Juki 6100 daisywheel	369.00
Olivetti JP101 sparkjet	125.00
Seikosha GP700A	365.00
Brother EP44	239.00
Shinwa CTA cp80 100 cps	199.00
Canon PJ 1185A Colour Printer	499.00
Juki 6300 40 Chr Pr Second	799.00
Brother HR15 Daisywheel	399.00
Alphacom printer for Spectrum	74.95

SANYO MB SERIES

Sanyo MBC 550 16 bit Micro	599.00
Sanyo MBC 555 16 bit Micro	899.00
Sanyo Printer cable	18.00
Sanyo CRT 36 green monitor	125.00

(above include Wordstar, Calcstar etc.)

MONITORS

Microvitec 1431/MS4 Standard colour	199.00
Microvitec 1451/MS4 Medium colour	269.00
Microvitec 1441/MS4 High	395.00
Microvitec 1431/AP/MS4 (PAL/AUDIO)	225.00
Sanyo NB colour only	169.00
Zenith 123 EA Green Monitor	79.95
Zenith 122 EA Amber Monitor	79.95
Philips TP 200 Monitor	75.00
Cable CE 370A colour monitor only	149.00
Yangyen Swivel Green Monitor (F1 Compatible)	109.95
BMC High Resolution Green Monitor	110.00
Swivel Stand for BMC (PA900)	19.95

MAIL ORDER

To: Microworld Distribution,
4 St. Andrew Square,
Edinburgh EH2 2DB

Please send me ....

....

....

I enclose a cheque for £....................

My credit card no is

....

Access/Visa/American Express (delete)

Name ....

Address ....

....

.................Tel. No.. ....

BRANCH NETWORK

Glasgow

11 Bath Street
Glasgow 041 332 1116

415/419 Blythswood Court,
Anderston Cross Centre,
Glasgow 041 226 3011

Edinburgh

12 Leven Street,
Tollcross,
Edinburgh 031 228 1111

4 St. Andrew Square,
Edinburgh 031 557 2087

Aberdeen

77 Holburn Street,
Aberdeen 0224 571735

Despatch Dept.
Constable House,
Hopetoun Street,
Edinburgh EH7 4NF
031-556 0191 x240

A 3" DISC DRIVE WITH A BONUS WORTH £100.

THE OPUS 3" DISC DRIVE + BONUS OF DOUBLE DENSITY DISC INTERFACE

£229·95 (INC. VAT.)

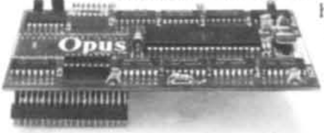
2 YEAR GUARANTEE

For only £229.95 you can have one of the best bargains available.

An Opus 500K double-sided disc drive and an Acorn compatible double density disc interface. That's over £100 off the normal retail price.

But the bargain doesn't stop there. Because these drives have the Opus name for reliability. Which is why we have the confidence to give a two year guarantee on all our drives.

The reason we can be so confident is that our drives are tested to the limit – running for over 8,000 hours. That's a year of constant use without failure.



DOUBLE DENSITY DISC INTERFACE.

To make sure you're not disappointed, complete the coupon and send it off today.

GUARANTEED 48 HOUR COURIER DELIVERY. NATIONWIDE.

GENEROUS EDUCATION DISCOUNTS GIVEN. PLEASE PHONE FOR DETAILS.

OPUS SUPPLIES LTD.
158 Camberwell Road, London SE5 0EE.
Opening hours:
9.00-5.30pm Monday to Friday.

☎ 01-701 8668
01-703 6155
Telex: 295931

To: Opus Supplies Ltd., 158 Camberwell Road, London SE5 0EE. Please rush me the following: **(ALL PRICES INCLUDE VAT & CARRIAGE.)**

Quantity	Description	Price
	TOTAL	

I enclose a cheque for £ ____________
Or please debit my credit card account with
the amount of £ ____________
My Access/Barclaycard (please tick) No. is
____

Name ____________
Address ____________
____
____
Telephone ____________

Opus.
Opus Supplies Ltd.

BU10

ERY SPECIAL OFFER
AVAILABLE NOW! SEE
YOUR LOCAL DEALER

SLIMLINE PRECISION

PACE
Disc Systems
PACE
Disc Systems

These superbly engineered slimline disc drives for the BBC Microcomputer are unsurpassed in quality and accuracy. They feature direct drive brushless D.C. motors and long-life ceramic read/write heads for maximum reliability, and a die cast alloy chassis which gives rigidity and long term stability. Furthermore, advanced chip technology, using large scale integration permits extremely low power consumption to be achieved.

The Pace range includes drives which are switchable between 40 and 80 tracks. Double sided drives give a massive 400K storage per drive in 80 track mode, whilst in 40 track mode they retain compatibility with all commercially available BBC software. All Pace drives will support double density operation.

PACE disc drives are supplied complete and ready to run direct from the BBC's power supply. They are supplied complete with all cables, a utilities disc, and manual. Pace even supply a blank disc so that the drive is ready for immediate use!

Available from your local dealer or direct from:

PACE
Disc Systems

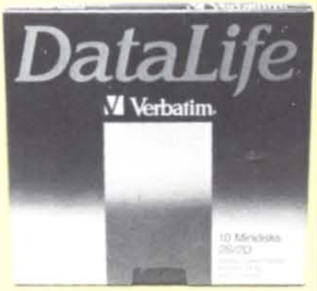
92 NEW CROSS STREET,
BRADFORD BD5 8BS.
Tel. (0274) 729306
Telex 51564

Disc drives available:-

SINGLE DRIVES		
PSD1	Single Sided 40 Track	100k
PSD2	Double Sided 40 Track	200k
PSD3	Double Sided 40/80 Track	400k
PSD4	Double Sided 80 Track Only	400k
PSD5	Single Sided 40/80 Track	200k
DUAL DRIVES		
PDD1	Single Sided 40 Track	200k
PDD2	Double Sided 40 Track	400k
PDD3	Double Sided 40/80 Track	800k
PDD4	Double Sided 80 Track Only	800k
PDD5	Single Sided 40/80 Track	400k

Available from good Computer stores everywhere including:
Computer City, Widnes, Cheshire. Tel. 051-420-333. Computerama, Stafford Tel. 0785-41899. Computerama, Stoke-on-Trent. Tel. 0782 268620. Silicon Centre, Edinburgh. Tel. 031-557-4546. G.T.M. Leeds. Tel. 0532 647474. Wilding Computer Centre, Wigan. Tel. 0942 44382. National Micro Centre, Stockport. Tel. 061-480-4523. Sir Computers, Cardiff. Tel. 0222 21341. Eltec Computers, Bradford. Tel. 0274 722512.

DISKING Means Business



The Biggest name in Disks!

5¼" Diskettes

Prices and quantities relate to **Ten-Packs**

PRICES EXC VAT	**1-4**	**5-9**	**10+**
MD 525-01 S/S 48 tpi	22.90	21.90	20.90
MD 550-01 D/S 48 tpi	29.90	28.90	27.90
MD 577-01 S/S 96 tpi	28.90	27.90	26.90
MD 557-01 D/S 96 tpi	36.90	35.90	34.90

Certified for single OR double density
48 tpi suitable for 35 or 40 track operation
96 tpi suitable for 77 or 80 track operation

8" Diskettes

Prices and quantities relate to **Ten-Packs**

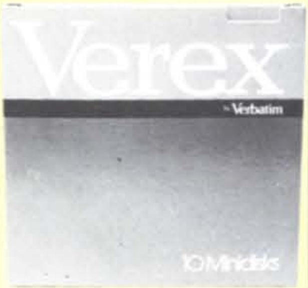
PRICES EXC VAT	**1-4**	**5-9**	**10+**
FD 34-9000 S/S S/D	31.90	30.90	29.90
FD 34-8000 S/S D/D	31.90	30.90	29.90
DD 34-4001 D/S D/D	36.90	35.90	34.90

32 Hard Sector available at same price

3½" Microdisks

Prices and quantities relate to **Ten-Packs**

PRICES EXC VAT	**1-4**	**5-9**	**10+**
MF 350 S/Sided 0.5Mb	42.90	41.90	40.90



Famous name — Low Prices

5¼" Diskettes

Prices and quantities relate to **Ten-Packs**

PRICES EXC VAT	**1-4**	**5-9**	**10+**
MD 200-01 S/S 48 tpi	19.90	18.90	17.90
MD 250-01 D/S 48 tpi	23.90	22.90	21.90

48 tpi suitable for 35 or 40 track operation

8" Diskettes

Prices and quantities relate to **Ten-Packs**

FD 34-1500 S/S S/D	22.90	21.90	20.90
DD 34-1501 D/S D/D	29.90	28.90	27.90

32 Hard Sector available at same price

MEMOREX
Mini Flexible Disc

MEMOREX Memory Excellence

5¼" Diskettes

Prices and quantities relate to **Ten-Packs**

PRICES EXC VAT	**1-4**	**5-9**	**10+**
3481 S/S 48 tpi	22.90	21.90	20.90
3491 D/S tpi	29.90	28.90	27.90
3504 S/S 96 tpi	28.90	27.90	26.90
3501 D/S 96 tpi	36.90	35.90	34.90

Certified for single OR double density
48 tpi suitable for 35 or 40 track operation
96 tpi suitable for 77 or 80 track operation

5¼" Diskettes HIGH DENSITY

Prices and quantities relate to **Ten-Packs**

PRICES EXC VAT	**1-4**	**5-9**	**10+**
5500 D/S 1.6 MByte	49.90	48.90	47.90

3½" Microdisks

Prices and quantities relate to **Ten-Packs**

PRICES EXC VAT	**1-4**	**5-9**	**10+**
6100 S/Sided 0.5Mb	42.90	41.90	40.90

maxell.
MD1-D

Maxell — The Gold Standard

5¼" Diskettes

Prices and quantities relate to **Ten-Packs**

PRICES EXC VAT	**1-4**	**5-9**	**10+**
MD1-D S/S 48 tpi	23.90	22.90	21.90
MD2-D D/S 48 tpi	34.90	33.90	32.90
MD1-DD S/S 96 tpi	34.90	33.90	32.90
MD2-DD D/S 96 tpi	42.90	41.90	40.90

Certified for single OR double density
48 tpi suitable for 35 or 40 track operation
96 tpi suitable for 77 or 80 track operation

8" Diskettes

Prices and quantities relate to **Ten-Packs**

PRICES EXC VAT	**1-4**	**5-9**	**10+**
FD1-XD S/S D/Dens	32.90	31.90	30.90
FD2-XD D/S D/Dens	40.90	39.90	38.90

32 hard sector available at the same prices

3½" Microdisks

Prices and quantities relate to **Ten-Packs**

PRICES EXC VAT	**1-4**	**5-9**	**10+**
MF2-DD D/Sided 1.0Mb	59.90	58.90	57.90

3" Microdisks

Prices and quantities relate to **Ten-Packs**

PRICES EXC VAT	**1-4**	**5-9**	**10+**
CF2 Compact D/S Floppy	39.90	38.90	37.90

DISKETTE STORAGE

Choose the box you like, buy three and get the fourth one FREE

BUDGET RANGE

Budget Micro

30 Microdisk capacity (or 12 compact 3" disks) stored in 3 compartments. Smart two tone beige brown with strong steel hinges.

Part No:	Description	Price exc VAT
BM	30 Microdisk capacity	6.90

If buying 3 to get one FREE, P&P @ 4 unit rate please

Budget 30

30 Minidisk capacity in smart beige brown with strong steel hinges, complete with five coloured dividers.

Part No:	Description	Price exc VAT
B30	30 Minidisk capacity	[illegible].90

If buying 3 to get one FREE, P&P @ 4 unit rate please

Budget 50

50 Minidisk capacity in smart two tone brown, complete with four dividers and non scratch rubber feet.

Part No:	Description	Price exc VAT
B50	50 Minidisk capacity	8.90

If buying 3 to get one FREE, P&P @ 4 unit rate please

POPULAR RANGE

Disking Swing-Lid Lockable Box

60 Minidisk capacity, complete with keys, dividers tags and even built in carrying handles.

Part No:	Description	Price exc VAT
DSLB	60 Minidisk capacity	17.90

If buying 3 to get one FREE, P&P @ 4 unit rate please

maxell
Verex
maxell

Jumbo Swinger

A massive 120 minidisk capacity (with arms removed). Adjustable arms compensate for less diskettes, complete with keys and carrying handle.

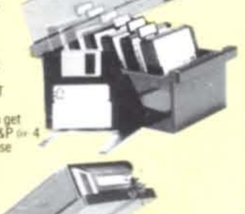
Part No:	Description	Price exc VAT
JUMBO	100 Minidisk capacity	18.90

If buying 3 to get one FREE, P&P @ 4 unit rate please

Executive Micro 50

Fifty 3.5" microdisk capacity complete with removable lid, dividers, tabs, lock and 2 keys

Part No:
EM50
Description
50 microdisk capacity
Price exc VAT
19.90
If buying 3 to get one FREE, P&P @ 4 unit rate please



Executive Mini 100

100 5.25" minidisk capacity complete with removable lid, dividers, tabs, lock and 2 keys.

Part No:	Description	Price exc VAT
EM100	100 minidisk capacity	22.90

If buying 3 to get one FREE, P&P @ 4 unit rate please

EXECUTIVE RANGE

The ultimate in quality, these beautiful Austrian made storage boxes in luxurious two tone deep brown come with everything one could ever want. The lids not only swing open and shut, but are also removable if shelf space is prohibitive. They come with ingenious dividers where even the tabs are adjustable and protected from dirty finger marks. The wonderfully engineered locking mechanism comes with 2 keys and a master filing tab.

DISKING INTERNATIONAL
FREEPOST
LIPHOOK, HAMPSHIRE GU30 7BR
UNITED KINGDOM

How to Contact DISKING:— By Telephone (0428) 722563
By Telex 858623 Telbur G

Dysan
TEN 5.25 INCH DISKETTES
SPECIAL CONFIGURATION

Dysan For The Discerning

5¼" Diskettes

Prices and quantities relate to **Ten-Packs**

PRICES EXC VAT	1-4	5-9	10+
104/1D S/S 48 tpi	23.90	22.90	21.90
104/2D D/S 48 tpi	34.90	33.90	32.90
204/1D S/S 96 tpi	34.90	33.90	32.90
204/2D D/S 96 tpi	42.90	41.90	40.90

Certified for single OR double density
48 tpi suitable for 35 or 40 track operation
96 tpi suitable for 77 or 80 track operation

8" Diskettes

Prices and quantities relate to **Ten-Packs**

PRICES EXC VAT	1-4	5-9	10+
3740/1D S/S D/Dens	32.90	31.90	30.90
3740/2D D/S D/Dens	40.90	39.90	38.90

32 hard sector available at the same prices

How To Order

Official Government Orders Welcome

We supply all Government bodies including Schools, Universities, colleges, Hospitals, the Utilities, Research Establishments, Armed Forces, the Ministries and Local Authorities world-wide. We will despatch within 4 (YES, FOUR) working hours from receipt of your official order number received either by post or telephone and all orders are handled in the strictest confidence and to the letter. All other customers, cheque with order please payable to DISKING. If you are a large establishment and cannot raise cheques without an invoice, please post or telephone your order, and we will send a pro-forma invoice by return for your accounts department to pay against.

Credit Card Orders

All orders left on the answering machine qualify for a FREE DISKING logobug to stick on your computer. You may call 365 days a year, 24 hours a day, and you may speak for as long as you like when you leave the following details:

1. Day-time telephone number
2. Cardholder name and address
3. Delivery (or invoice address) if different
4. Your Credit Card Number
5. What you want and how many
6. Normal or first class post

We welcome Access (Mastercharge), Barclaycard (VISA) and Diners Club International, and there is NO credit card surcharge. Alternatively you may write your credit card number on your order

Leave the REST to US!

Urgent Orders

If you are posting your order, leave out the word FREEPOST from our address, and use our normal post code GU30 7EJ and do not forget to stamp it First Class. If you are telephoning your order, please make it clear that you wish to pay for your goods to be sent to you by First Class Post

First Class Rates

Minidisks & Microdisks:	
First Ten-Pack	2.00
Second and subsequent Ten-Pack	1.50

COLOURED Diskettes

Supplied in *Five-Packs* of one colour
Prices and quantities relate to **Five-Packs**
5¼"

PRICES EXC VAT	1-9	10-19	20+
1D S/S 48 tpi	12.90	11.90	10.90
2D D/S 48 tpi	18.90	17.90	16.90
1DD S/S 96 tpi	18.90	17.90	16.90
2DD D/S 96 tpi	21.90	20.90	19.90

To order the colour your choice, just precede the type number with the appropriate letter, (R) RED, (O) ORANGE, (Y) YELLOW, (G) GREEN, (B) BLUE & (P) PALE BLUE. For the actual colours, please see our full colour advertisement back a couple of pages, or call and ask for our full colour brochure

FREE CLOCK

1:30
DISKING
FLOPPY DISKS
0428 722563
LCD TABLE CLOCK

value £8.95

with EVERY 20 Diskettes ordered at these prices

When you buy twenty 5.25", 8" or 3.5" diskettes at these prices, from any of our manufacturers, you will receive completely FREE of charge, this superb calendar clock with a large easy to read 24mm LCD display. Buy forty diskettes and you will receive two clocks and so on.

Offer ends 30th April 1985

PLUS

FREE with every Ten-Pack of diskettes from DISKING, (or Five-Packs if coloured disks). The Superb SEE10 Library Box. Also available individually for £2.50 exc VAT, either for 5¼" Disks (SEE10), or 3½" Disks (SEE10-3). Now also available for 8" Disks (SEE10-8) at £3 exc VAT.

PLUS

FREE DISKING Colour Coders
A multicoloured pack of ten fibre tipped pens for colour coding your diskette labels. Available individually at 49p exc VAT

Very Urgent Orders

If ordering by telephone, and by 3pm, you may request Datapost which delivers the next morning at 9am. Minimum cost is £10 for the first 5kg – please call

Desperate Orders

Just call and ask for Joan or Roger and we will do whatever we can to help you with your problem. If you are not too far we can probably organise a taxi or courier

Postage & Packing Rates

UK Shipping Rate inc. ins. but exc VAT

5¼" DISKS OR MICRODISKS
1-2 packs each pack @ 95p
3-5 packs each pack @ 75p
6-9 packs each pack @ 60p
10+ packs POST FREE
ALL SEE 10 library boxes
ALL MEMOREX CLEANING KITS
1 off 60p each
2-7 off 40p each
8+ off POST FREE

DISKETTE STORAGE
Budget 30
1 off 1.00 each
2-7 off 70p each
8+ off POST FREE

8" DISKETTES
1-2 packs each pack @ 1.60
3-5 packs each pack @ 1.20
6-9 packs each pack @ 90p
10+ packs POST FREE

DISKING COLOUR CODERS
25p each — 5+
POST FREE

DISKMAILERS
£3.00 per 100

ALL OTHER STORAGE
1 off 2.00 each
2-7 off 1.30 each
8+ off POST FREE

DISKING DISKWRITERS
50-pack £1.00
1-4 off @ 40p each
5-9 off @ 30p each
10+ off @ 20p each

Bargain Corner Diskettes

5¼" Diskettes

Complete with a FREE SEE10 library box and Colour coders, these disks are certified and are from one of the manufacturers in this ad
Prices and quantities relate to **Ten-Packs**

EXC VAT No hub ring	1-4	5-9	10+
UL1D S/S 48 tpi	13.90	12.90	11.90
UL2D D/S 48 tpi	20.90	19.90	18.90
UL1DD S/S 96 tpi	20.90	19.90	18.90
UL2DD D/S 96 tpi	24.90	23.90	22.90

Suitable for single OR double density

EXC VAT With hub ring	1-4	5-9	10+
UL1DHR S/S 48 tpi	14.90	13.90	12.90
UL2DHR D/S 48 tpi	21.90	20.90	19.90
UL1DDHR S/S 96 tpi	21.90	20.90	19.90
UL2DDHR D/S 96 tpi	25.90	24.90	23.90

Suitable for single OR double density
48 tpi suitable for 35 or 40 track operation
96 tpi suitable for 77 or 80 track operation

Disking Supermailers

These diskette mailers come packed in 100s and are of a very clever copyright design. They will hold up to 4 diskettes complete with envelopes and are extremely robust

Part No.	Description	Price exc VAT
DSM	100 Supermailers	24.90

Trade Corner

***FREE* Aeroplane**

Our latest aeroplanes have sound, so you'll have no trouble waking up those sleepy software engineers, when you throw it at them. Just call and ask for our flier, and we'll send you our latest trade pack with prices, special offers and sample unlabelled diskette. We'll also enclose a DPC (Disking Priority Customer Card) application form telling you how to buy at our 10,000 prices yet order in 50s.

Memorex Cleaning Kits

MEMOREX
MEMOREX
MEMOREX
COMPUTER CARE

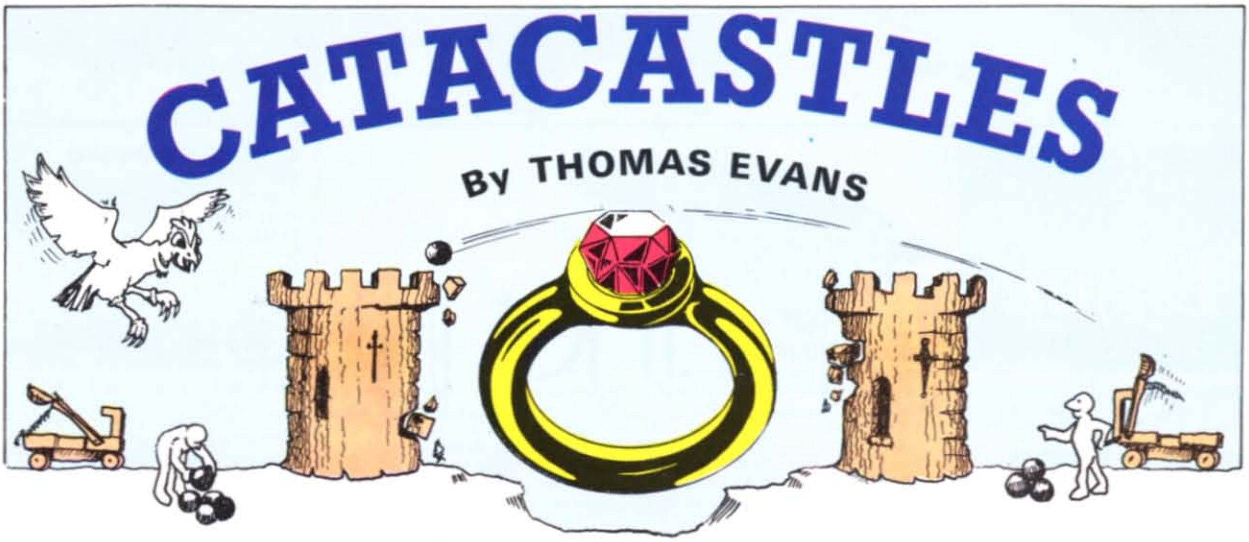
The latest computer care range from Memorex represent fantastic value for money, and are available individually or with a discount if purchasing all three.

Part No:	Description	Price
MKEY	Case/keyboard cleaning kit	4.90
MTV	VDU screen cleaning kit	4.90
MDD	Disk drive head cleaning kit	8.90

Buy all three kits together, and we will reduce the total price from 18.70 to 14.90 SAVING 3.80 — A BARGAIN IF EVER WE SAW ONE!

CATACASTLES

BY THOMAS EVANS



MANY years ago there lived a sorcerer in the land of Wong. On his many voyages and adventures he captured one item which he valued more than all else – a ruby with strong magical powers.

Also in the land of Wong lived a mighty baron. One day at a feast, long after the sorcerer had finished his last adventure, the baron saw the ring and wanted it at once.

At midnight he sent one of his minions into the sorcerer's chamber to steal the ring. The minion, the baron and his followers then sped back to the baron's castle.

The next day the sorcerer realised what had happened and was furious. He called on the eagle king to act as judge and a vicious battle of magic ensued between the sorcerer and the baron who now had the ring.

Both were quickly drained of their magic until they died, devoid of all power and the ring disintegrated.

But the battle went on using catapults – you and another player succeeded the baron and the sorcerer.

To load your catapults hold down a key – Shift Lock for the left player, Copy for the player on the right. The longer you hold down the key the steeper the bullet will fly until you release the key which releases your bullet.

The aim is to destroy your opponent's castle – every hit crumbling it a little more.

Should you hit a catapult it will take the owner a little time to rebuild it. Similarly it takes time for a hit man to be replaced. If you hit the pterodactyl, it will catch your bullet, and drop it again when you next press your fire key.

Some useful tips:

- Fire as low as possible and go for your opponent's castle. In this way you can destroy it quicker.
- If you see a low bullet coming over your castle try and shoot it down. If it is a high flying bullet, or you are not confident, then release a high flying bullet over the opponent's castle just before being hit. Then when you are revived, he has still a long time to wait, which you can take advantage of.
- The bird is slow, so only use it if you cannot hit a brick, or to catch a vertically aimed shot which would possibly hit you after being released.

The actual program is just over 6k long and runs in Mode 7. Only 0.1 available FX calls were used, so Catacastles should run on all BBC types.

The program is in seven main parts.

```
   10 REM CATACASTLES by Thomas Evans
   20 REM #### DOUAI SCHOOL ####
   25 REM (C) The Micro User
   30 REM SET UP GRAPHICS
   40 *TV255
   50 *FX4,1
   60 MODE7
   70 VDU23;8202;0;0;0
   80 FORT%=15TO20
   90 PRINTTAB(14,T%);CHR$(151)
  100 NEXT
  110 VDU31,0,21,130,157,148,31,19,21
,235,255,183,13,10,130,157,148,31,20,
22,175,13,10,130,157,148
  120 PROCman(0,1):PROCman(37,2)
  130 FORX=3TO31STEP28
  140 VDU31,X,19,149,191,175,255,175,
111,31,X,20,145,170,191,160,239,165
  150 NEXT
  160 PROCcata(1,0):PROCcata(2,0)
  170 PROCcastle(9):PROCcastle(27)
  180 PROCtitle:PRINT"DO YOU WANT INS
TRUCTIONS?";:G$=GET$:IF G$="Y" OR G$=
"y" PROCinstruct
  190 FORT%=0TO14
  200 PRINTTAB(0,T%);CHR$(151);SPC(38
)
  210 NEXT
  220 VDU31,0,3,150,13,10,150
  230 REM SET UP VARIABLES ----------
--
  240 DIM B%(1,2),A(4,2),C%(2),KO%(2)
,P%(2),AN(2),OG%(2),G%(2),I%(2),DA%(2
)
  250 B%(0,0)=1:B%(1,0)=2:B%(0,1)=4:B
%(1,1)=8:B%(0,2)=16:B%(1,2)=64
  260 KO%(1)=0:KO%(2)=0:C%(1)=0:C%(2)
=0:AN(1)=1.6:AN(2)=4.7:G%(1)=0:G%(2)=
0:I%(1)=-81:I%(2)=-106
  270 A%=135:DA%(1)=20:DA%(2)=20:D%=1
:X%=3:R%=1:T%=0:TIME=0
  280 ENVELOPE1,2,1,-1,1,1,1,1,121,-1
0,-5,2,125,120
  290 ENVELOPE2,3,0,0,0,0,0,0,121,-10
,-5,-2,120,120
  300 ENVELOPE3,6,2,1,1,1,1,1,121,-10
,-5,-2,120,120
  310 ENVELOPE4,1,0,0,0,0,0,0,61,0,-1
0,-120,120,0
  320 REM MAJOR LOOP
  330 FOR Z%=1TO2
  340 IF C%(Z%)<>0 GOTO 410
  350 OG%(Z%)=G%(Z%):G%(Z%)=INKEY(I%(
Z%))
  360 F%=AN(Z%)*20:IF F%=0 OR F%=126
GOTO 390
  370 IFG%(Z%)=-1 VDU31,20+FNMAN(Z%)*
17,18,163
  380 AN(Z%)=AN(Z%)-G%(Z%)*FNMAN(Z%)*
.05
  390 IF G%(Z%)=0 AND OG%(Z%)=-1 PROC
fire
  400 GOTO640
  410 IF(C%(Z%) AND 1)=0 GOTO 500
  420 VDU31,A(1,Z%),A(2,Z%),P%(Z%)
  430 A(4,Z%)=A(4,Z%)-.0325
```

PROGRAM STRUCTURE

Line no.	
10-210	Sets up graphics using the animation subroutines.
220-290	Sets up arrays, variables and envelopes.
300-620	The main program loop. This is subdivided into four parts, explained later.
630-1110	The graphics subroutines during the game.
1120-1670	Procedures to do calculating tasks.
1680-1890	The instructions.
1900-1990	End of game routine.

***The main loop:** This revolves around the variable C%() which uses bits 0, 1, 2 as flags:*

bit 0	Set if player's bullet is in flight.
bit 1	Set if player is knocked out.
bit 2	Set if player controls the bird.

These values of these bits determine the four parts of the main loop:

Line no.		
320-380	*C%() clear*	Ready to load the gun.
390-470	*bit 0 set*	Updates and checks bullet
480-540	*bit 1 set*	Player knocked out.
550-610	*bit 2 set*	Control of bird.

The graphics routines:

630-690	*move bird*	Outside loop to keep it slow TIME used for even flapping.
1610-1650	*castle collapse routine*	If the castle is hit below the top, the bricks above fall down.

PROCEDURES

PROCcata (player, type)	Type : 0=down 1=up draws top of catapult, bottom drawn at 120-140.
PROCcatacl (player)	Deletes top when hit.
PROCcastle (player)	Draws player's castle.
PROCman (X,direction)	Draws man at X coordinate – can be used for sulking man.
PROCptero (dir, type, X)	Draws pterodactyl in the right direction at X, with flap type – 0 or 1.
PROCtitle	Does CATACASTLE title.
FNMAN(player)	Gives −1 or 1 for player (1 or 2), used to establish which player concerned.
PROCfire	Sets X,Y coordinates and flight vectors. Also sets C%() and does effects.
FNPOINT (X,Y)	Finds ASC code of screen X,Y coordinates.
PROCbullet (X,Y)	Plots X,Y coordinate within cell.
PROCtermin(player)	Terminates players bullet.
PROChit	Establishes what was hit. Also calls three other subroutines.
PROCsulk(player)	Sets KO%() and makes player sulk.
PROCdud(side)	Sets KO%() and makes the catapult of that side dud (SIDE is like PLAYER).
PROCbull(side,player)	Castle hit and collapses. The hit counter – array DA% – is decremented.
PROCinstruct	Instructions.

```
  440 A(1,Z%)=A(1,Z%)+A(3,Z%)
  450 A(2,Z%)=A(2,Z%)-A(4,Z%)
  460 P%(Z%)=FNPOINT(A(1,Z%),A(2,Z%))
  470 IF P%(Z%)>160 PROChit:GOTO 500
  480 IF A(2,Z%)>21 PROCtermin(Z%):SO
UND1,-13,40,3:GOTO 500
  490 PROCbullet(A(1,Z%),A(2,Z%))
  500 BIT=C%(Z%) AND 2
  510 IF NOT(BIT=2) GOTO 570
  520 KO%(Z%)=KO%(Z%)-1
  530 IFKO%(Z%)<>0GOTO640
  540 C%(Z%)=C%(Z%)AND253:SOUND1,-13,
40,3
  550 IFZ%=1 PROCman(0,1):PROCtermin(
1) ELSE PROCman(37,2):PROCtermin(2)
  560 GOTO640
  570 BIT=C%(Z%) AND 4
  580 IF NOT(BIT=4) GOTO 640
  590 IFINKEY(I%(Z%))=0 GOTO 640
  600 PROCcata(Z%,1):SOUND0,2,29,10
  610 OG%(Z%)=0:C%(Z%)=1:P%(Z%)=160
  620 A(1,Z%)=X%+1:A(2,Z%)=5
  630 A(3,Z%)=0:A(4,Z%)=0
  640 NEXT Z%
  650 IF TIME<30 GOTO 330
  660 TIME=0
  670 R%=R%+1:IFR%=3 R%=1
  680 IF R%=2 X%=X%+D%
  690 IFX%<2 OR X%>36 D%=D%*-1:X%=X%+
D%
  700 PROCptero(D%,R%,X%)
  710 GOTO330
  720 END
  730 DEFPROCman(X,N)
  740 ON N GOTO 750,770
  750 VDU31,X,17,149,239,164,31,X,18,
147,234,51,31,X,19,147,254,165,31,X,2
0,148,234,176
  760 GOTO780
  770 VDU31,X,17,149,168,191,31,X,18,
147,227,181,31,X,19,147,170,253,31,X,
20,148,224,181
  780 ENDPROC
  790 DEFPROCcata(N,T)
  800 IF N=1 X=3 ELSE X=31
  810 ON T*2+N GOTO 820,840,860,880
  820 VDU31,X,16,150,176,176,31,X,17,
150,163,185,176,31,X+1,18,150,181,162
,228,235
  830 GOTO890
  840 VDU31,X+3,16,150,224,224,31,X+2
,17,150,224,230,163,31,X,18,150,183,1
84,161,234,147
  850 GOTO890
  860 VDU31,X,15,150,160,224,31,X,16,
150,160,169,184,31,X+1,17,150,176,170
,176,31,X+1,18,150,181,160,233,235
  870 GOTO890
  880 VDU31,X+3,15,150,176,31,X+2,16,
150,228,166,160,31,X+1,17,150,224,165
,224,160,31,X,18,150,183,182,160,234
  890 ENDPROC
  900 DEFPROCcatacl(N)
  910 ON N GOTO 920,940
```

Turn to Page 159

Follow in the footsteps of Elite with the EOR method

WE looked at the configuration of the Mode 2 screen last month and found out the colour of any pixel could be changed by storing different bytes in the relevant video RAM locations.

Now we'll go a bit further by joining several pixels together to form a character.

We know that the Mode 2 screen consists of 32 strips or character rows. These are split into 80 vertical rows one byte in width, each being 8 pixels high and 2 pixels wide (2 pixels per byte in Mode 2).

From this we can see that the number of characters per row in Mode 2 is 20. The 160 pixels horizontally (80 columns * 2 pixels), divided by 8 (width of a character in pixels) gives 20, therefore the number of bytes required to store a character is 32, not 64 as you might expect (8*8).

This is because the character is 8 bytes by 4 – remember that each horizontal byte corresponds to two pixels.

Have a look at Diagram I. This shows the size of each character cell.

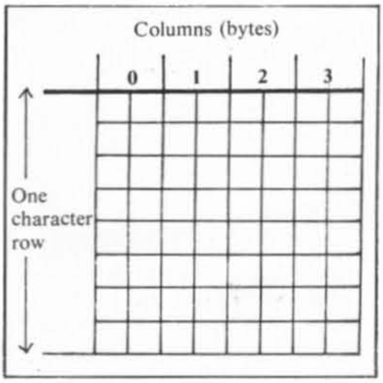


Diagram I: Character cell dimensions

You may think 24 bytes for one character is a bit wasteful when the VDU 23 command only requires eight byte parameters to define a shape of the same size. What you must remember is that a character defined by VDU 23 cannot be multi-coloured.

Let's design a space invader, 8 pixels by 8. For this we will have to calculate the 24 bytes that represent the shape and colour we want the invader. Diagram II shows the bytes required to produce a red space invader.

Table I in last month's article will help you understand how the bytes were calculated.

What we need to do now is find a way of displaying the space invader. Program I does this. The bytes of the video RAM are arranged in 8 byte columns. As we work our way down each column the memory location increases. So it would seem logical to store the data for the character in the same way.

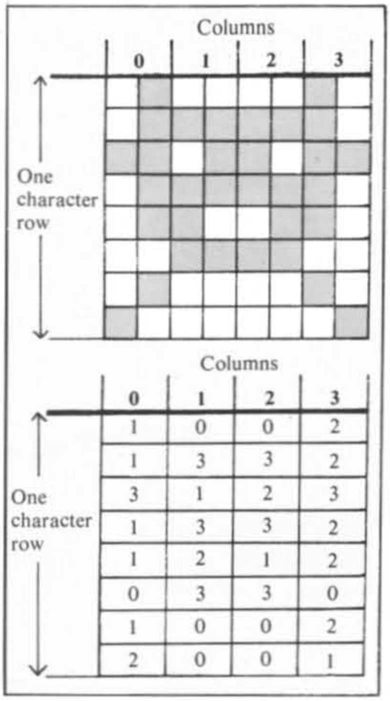
Storing the data like this allows us to use a simple indexing method to copy the bytes from outside the video RAM into the video RAM. The description of Program I gives the full details.

Diagram III shows the data for a yellow face. Again, the face is 8 pixels by 8 – a character. For simplicity I've designed characters with only one foreground colour.

You can use as many colours as you want for your own characters. The best way to design them is to use squared paper and felt tip pens. Then once you've finished designing your character you can calculate the bytes required to display the new shape. Substituting these with the data in Program I will allow you to see the results.

A future article will include a multi-coloured character definer. This will help speed up the definition of characters.

Program I can also be used to display



0	1	2	3
1	0	0	2
1	3	3	2
3	1	2	3
1	3	3	2
1	2	1	2
0	3	3	0
1	0	0	2
2	0	0	1

Diagram II: Parameters for a red invader

```
10 REM PROGRAM I
20 MODE 2
30 FOR pass=0 TO 2 STEP 2
40 P%=&B00
50 [OPT pass
60 .start LDY#31
70 .loop1 LDA&C00,Y
80 .display STA&5400,Y
90 DEY
100 BPL loop1
110 RTS
120 ]NEXT
130 FOR loop=0 TO 31
140 READ data
150 loop?&C00=data
160 NEXT
170 CALL start
180 END
190 REM Space Invader data
200 DATA1,1,3,1,1,0,1,2
210 DATA0,3,1,3,2,3,0,0
220 DATA0,3,2,3,1,3,0,0
230 DATA2,2,3,2,2,0,2,1
```

Program I: Plotting characters

Part two

HOW TO WRITE MACHINE CODE GAMES

By KEVIN EDWARDS

the face. In fact, any data for an 8 by 8 character will work with Program I. All you need to do is change the DATA lines to those shown in Listing I. It's so simple – and so quick!

```
190 REM Face data
200 DATA5,15,10,15,15,15,15,5
210 DATA15,15,5,15,15,5,0,15
220 DATA15,15,10,15,15,10,0,15
230 DATA10,15,5,15,15,15,15,10
```

Listing I

Program I's space invader is stored in the video RAM starting at location &5400 and ending at location &541F – 32 bytes. If we wanted to put another invader on the screen to the right of the existing one we would store the shape staring from location &5420 (&5400 + 32=&5420).

The 32 corresponds to the number of bytes needed to accommodate one character. We add this to the old start location to move the start address to the next character cell – the screen locations increase as you move to the right and decrease as you go to the left. Therefore to move one character cell to the left we would subtract 32 from the original start location.

Program II is similar to Program I except this time the start location is increased by 32 after each character is displayed and we also start at the top left of the screen. This moves the shape right by one character cell but leaves the previous shape on the screen.

All we need to do now is delete the previous character to produce a moving object – for the majority of cases you will not want to leave a trail behind a moving character.

The easiest way to delete a shape is to store zeros in the video RAM which contains the character data.

Storing zero produces two black pixels on the screen. Since black is the normal background colour, the previous shape disappears – printing a space on the screen has exactly the same effect.

The problem with deleting a shape in this way is that the background data is lost. A good example where problems would occur is in the arcade game Pacman.

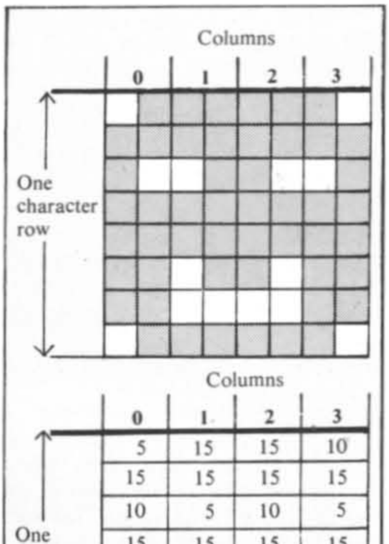
Here monsters move around a maze which is filled with dots. Your aim is to guide another character around the maze so that he collects all the dots by moving over them. If the monster characters were deleted by storing zeros in the video RAM the dots would be destroyed as soon as one of the monsters passed over them. That's rather pointless when the idea of the game is to eat up all the dots on the screen, for the monsters do it for you.

The problem is solved by using the logical operator EOR (Exclusive OR). This is very useful because its effect on numbers is reversible.

For example, consider two numbers X and Y. We shall define Z as being X EOR Y. The effect of EOR also allows us to say Y EOR Z=X and X EOR Z=Y. Using numbers, 1 EOR 2=3, 2 EOR 3=1 and 1 EOR 3=2.

The EOR function works by comparing corresponding bits of two bytes with each other, and depending on the state of the two bits produces a binary digit. This bit is used to build up a new byte – the resultant byte.

Table I shows the resultant bit for the



0	1	2	3
5	15	15	10
15	15	15	15
10	5	10	5
15	15	15	15
15	15	15	15
15	5	10	15
15	0	0	15
5	15	15	10

Diagram III: Parameters for a yellow face

```
10 REM PROGRAM II
20 MODE 2
30 FOR pass=0 TO 2 STEP 2
40 P%=&B00
50 [OPT pass
60 .start LDY#31
70 .loop1 LDA&C00,Y
80 .display STA&3000,Y
90 DEY
100 BPL loop1
110 LDA display+1
120 CLC
130 ADC#32
140 STA display+1
150 BCC no_carry
160 INC display+2
170 .no_carry RTS
180 ]NEXT
190 FOR loop=0 TO 31
200 READ data
210 loop?&C00=data
220 NEXT
230 FOR loop=1 TO 200
240 CALL start
250 REPEAT UNTIL GET
260 NEXT
270 END
280 REM Space Invader data
290 DATA1,1,3,1,1,0,1,2
300 DATA0,3,1,3,2,3,0,0
310 DATA0,3,2,3,1,3,0,0
320 DATA2,2,3,2,2,0,2,1
```

Program II: 'Moving' shapes

Bit n from 1st byte	Bit n from 2nd byte	Result bit
0	0	0
0	1	1
1	0	1
1	1	0

Table I: Truth table for EOR

→

From Page 75

four possible conditions of the two bits being compared. In the table, n is the nth bit of the two bytes being compared.

To show the EOR command in action we will EOR the numbers &9F and &54.

The first thing we do is convert them into binary. Now we take the first bit from each byte and find the resultant bit – using the "truth table". This bit is the first bit of the resultant byte. We now do exactly the same for the remaining seven bits to complete the new byte.

If this seems rather complex you will be relieved to know that the 6502 has an EOR command that does all the work for you. Diagram IV shows how to calculate &9F EOR &54 by hand.

To explain how EOR is used, consider &9F as being the background byte and &54 as the character byte. When the character passes over the background, and we use EOR to calculate the resultant byte which will be stored in the video RAM, we get &CB – &54 EOR &9F.

When we want to move the character to a new position we EOR the screen byte (&CB) with the character byte (&54) to move it off the screen.

```
&9F = % 10011111
&54 = % 01010100
        --------
      % 11001011 = &CB or 195
        --------
```

Diagram IV: EORing two bytes

> **'You will be relieved to know that the 6502 has an EOR command that does all the work for you...'**

If all goes well we get the original background byte (&9F). This means that we've moved a character over a background without disturbing it. Problem solved? Well almost.

So far we've dealt with EOR for one byte. So for a character which is several bytes in size we must perform the EOR on each byte we store in the video RAM.

EOR has two drawbacks. When an object passes over another the resultant byte, and therefore colour, is not the same as the background byte or the character byte – this means that a colour change occurs.

In the previous example we get &CB, which is totally different to the original bytes used.

The other problem with EOR is that when the character byte and the background byte are the same the

```
 10 REM PROGRAM III
 20 MODE 2
 30 FOR pass=0 TO 2 STEP 2
 40 P%=&B00
 50 [OPT pass
 60 .start LDY#31
 70 .loop1 LDA&C00,Y
 80 EOR&5400,Y
 90 .display STA&5400,Y
100 DEY
110 BPL loop1
120 RTS
130 ]NEXT
140 FOR loop=0 TO 31
150 READ data
160 loop?&C00=data
170 NEXT
180 REPEAT
190 CALL start
200 REPEAT UNTIL GET
210 UNTIL 1=2
220 REM Face data
230 DATA5,15,10,15,15,15,15,5
240 DATA15,15,5,15,15,5,0,15
250 DATA15,15,10,15,15,10,0,15
260 DATA10,15,5,15,15,15,15,10
```

Program III: EOR in action

PROGRAM I

30-50	Select options for assembler.
60	Loads the Y register with 31. This is used as an offset which decrements from the last byte of the character's position to the first byte of the character's position.
70	Reads a data byte from location &C00+Y. The last data byte is read first and the first data byte is read last.
80	Stores the data byte in the video RAM at location &5400+Y. Again working from the end to the start location.
90	Decrements the offset register, Y.
100	Branches to do the next data byte if the Y register is still positive – in the range 0-127. This branch is not taken when the Y register becomes &FF (255 in decimal) – this means that the 32 data bytes have been stored in the video RAM, and Y has taken the values 31 to 0. It is easier to use an offset register which decrements from the end to zero than one which increments from 0 to the end because you do not need to use a CMP command or, in this case, CPY to test if all of the bytes have been copied. Program IA illustrates this, doing exactly the same as program I but starting at the first data byte and ending at the 32nd one.
110	Returns to Basic.
120	Ends assembler.
130-160	Store data bytes for character into PAGE &C.
170	Calls the machine code subroutine.
180	ENDs the program.
190-230	Data for the space invader – column by column, that is the first eight values define column 1, the next eight column 2 and so on. Remember &5400-&5407 are the memory locations of the first column. &5408 gives the start byte of the next column.

PROGRAM II

10-50	See program I description.
60-100	The same as Program I except this time we display the data starting from the top left corner (&3000).

resultant byte will always be zero – the background colour, black.

One byte which matches the background will not be very noticeable. But when two identical characters are directly on top of one another the result will be two invisible characters. Rather hard to see.

Despite these disadvantages, many commercial games use this method to display characters on the screen.

To show EOR in action try Program III. All this does is use the EOR method to display a face character on the screen.

Initially the face appears in the centre of the screen. Since the background bytes are all zero and EORing any number with 0 leaves the number unchanged the data stored in the video RAM will be identical to the character data.

Pressing a key causes the same shape to be placed on the screen again. Since EOR has been used to calculate the resultant bytes, the face disappears. This is because EORing a byte with itself results in zero – this was the original background colour.

So from this we can see that calling the routine the first time displays the face and calling the same routine again erases the face. In other words, the character display routine is also a character delete routine – two for the price on one!

It is for this reason that program writers use the EOR method to display shapes – it only needs one routine. Even Elite uses EOR when it plots lines on the screen.

Try adding the following line to program III:

```
175 VDU 31,8,14,ASC"A"
```

This displays the letter A underneath the face character. Any points of the letter A and the face which overlap produce a new colour, blue because of the effect EOR has. These points will be blue (colour 4), because, 3 (yellow face) EOR 7 (white letter A) = 4.

Pressing Space deletes the face and leaves the letter A on the screen – this time the A will be in its original colour, white.

● *That's enough for this month. Next month we are going to move shapes around the screen.*

```
 10 REM PROGRAM IA
 20 MODE 2
 30 FOR pass=0 TO 2 STEP 2
 40 P%=&B00
 50 [OPT pass
 60 .start LDY#0
 70 .loop1 LDA&C00,Y
 80 .display STA&5400,Y
 90 INY
100 CPY#32
110 BNE loop1
120 RTS
130 ]NEXT
140 FOR loop=0 TO 31
150 READ data
160 loop?&C00=data
170 NEXT
180 CALL start
190 END
200 REM Space Invader data
210 DATA1,1,3,1,1,0,1,2
220 DATA0,3,1,3,2,3,0,0
230 DATA0,3,2,3,1,3,0,0
240 DATA2,2,3,2,2,0,2,1
```

Program IA: An alternative way of plotting a character

110-140	Add 32 to the screen location to move the start location to the next character cell. This method involves self-altering code. By this I mean that bytes are "poked" into the machine code routine by the machine code routine. In this example it adds 32 to the low byte of the screen address.
150	Branches if the addition doesn't produce a carry.
160	Increments the high byte of the screen location. Again, this alters the machine code program by adding one to the screen's high byte.
170	Returns to Basic.
180	ENDs assembler.
190-220	Read and store the graphic data.
230-260	Loops round until 100 space invaders have been displayed.
240	Calls the routine which displays the space invader.
250	Waits until a key is pressed.
260	End of FOR TO loop.
270	End of program.
280-320	Space invader graphic data.

PROGRAM III

30-50	Set up assembler.
60	Sets offset register, Y, to 31.
70	Reads data byte into the accumulator from location &C00+Y.
80	EORs the accumulator with the contents of the destination location of the byte – the result is left in the accumulator.
90	Stores the accumulator in the video RAM at location &5400+Y.
100	Decrements the offset register, Y.
110	Branches if the character is not complete.
120	Returns to Basic.
130	Ends assembler.
140-170	Read and store the face data.
180	Start of infinite loop.
190	Calls the machine code routine to display the face or delete the face. Remember that the same routine can display a character or delete a character – it's a property of EOR.
200	Waits until a key is pressed.
210	Repeats the loop, since 1 will never equal 2.
220-260	Face graphic data.

COLOURJET

36 COLOUR INK JET PRINTER

Prints all BBC Micro
screen Modes inc.
Mode 7 . . . in full colour

£550 (Rec. price excl. VAT)

With Centronics parallel interface
and free BBC Micro dump listing.

Prints overhead transparencies

Options available:

- Buffered RS232 interface.
- Viewdata & RS232 interface.
- Apple II interface.
- IBM PC dump.

from BBC Micro screen – ½ size mode

Specifications:

640 dots/line + 1280 dots/line high res mode.

Double strike mode.

84 dots/inch both axes.

Friction feed rollpaper with single sheet feed A4.

40cps in full colour.

Ink cartridges, 4 million character life.

Virtually silent
R & D
SCHEMATA, KARTEN, DIGRAMME
700d
WETTERKARTE
FREITAG, 30JAN81
Temperaturen
Oslo........11
Kopenhagen..13
London......18
Paris.......18
Frankfurt...20
Madrid......21
Rome........25
Belgrad.....23
Schnee
Regen
Nebel
Bewulkt
Sonnig
INTEGREX
FF
LF
ON LINE
ON LINE
ALARM
READY

INTEGREX LTD.

Church Gresley, Burton-on-Trent, Staffs DE11 9PT
Tel: 0283 215432 Telex: 377106

Dealers, OEM & Educational
enquiries welcome

MD 400
£155.65
+ VAT= £179
MD 800
£312.17
+ VAT = £359
MD 800P
£373.04
+ VAT = £429

BBC Compatible Mitsubishi Slimline Disc Drives

These are high capacity, precision drives with dynamic clamping and very low power consumption. All drives are supplied with cables, a very comprehensive utility/format disc and a manual.

MD 400 — 400K (800K double density) 40/80 track switchable double sided single drive.

MD 800 — 800K (1600K double density) independently 40/80 track switchable double sided dual drive.

MD 800P — 800K (1600K double density) independently 40/80 track switchable double sided dual drive unit with built-in power supply and monitor stand.

Opening Hours: Mon-Fri 9am-6.30pm
Sat 10am-5pm (ample parking)
We accept telephone orders on Barclay and Access Cards.

Mail Order: Cheques or bankers draft payable to Akhter Instruments.
Delivery free of charge (UK only)

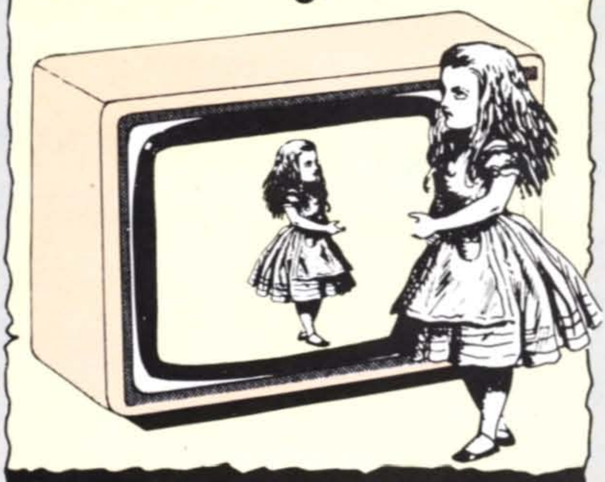
AKHTER
COMPUTER GROUP

28/29 BURNT MILL, HARLOW, ESSEX CM20 2HU UK.
TEL. HARLOW (0279) 443521 TELEX 818894 AKHTER G

Dealer Enquiries Welcome

Frying tonight in Eden? Not likely!

Alice through the VDU



Our monthly foray into Adventure games

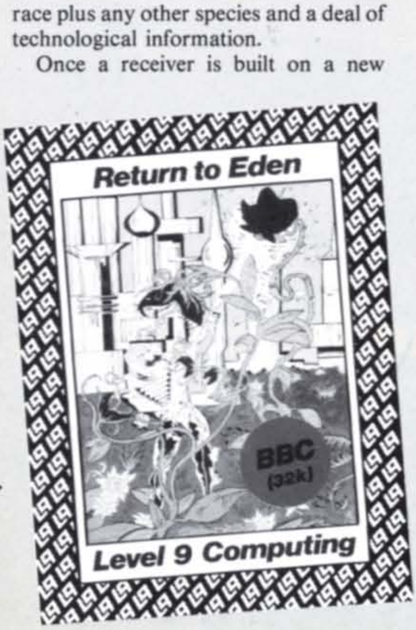
RETURN to Eden (Level 9) is the second in the Snowball trilogy. The first was "probably unique among adventures in having a realistic, planned background and being set aboard a starship that could actually work".

The background is an interstellar flight to the planet Eden which, supposedly, orbits Eridani A or Achernar, a blue-white B5 (sometimes called helium stars) and the ninth brightest in the sky. Its position is 24 degrees past the 1st point of Aries with a declination (latitude) of 57 degrees south, therefore only visible in southern skies.

So why are we told that Eridani A is a binary system of a red giant and a smaller G-type star? and "Eden orbits this latter, yellow star" – which is an unstable, three-body pattern?

Also the starship is as unlikely as a flying carpet. The idea of shipping 200,000 adults in deep freeze is nonsense when the only requirement is to send the DNA code of the human race plus any other species and a deal of technological information.

Once a receiver is built on a new planet all this can be sent by radio. Interstellar expansion will be an extremely unexciting final frontier, mostly squabbling between America and Russia (or their equivalents) about who gets to beam their "master genes" and culture to the north side of the galaxy.



And the Megellanic Clouds might well turn into a Falklands war between Australia and Argentina with the Pope's opinion quite irrelevant to this form of reproduction.

This second game starts off rather like Countdown to Doom. You have landed on Eden and have about 15 moves to find cover before being fried by the ungrateful mob you saved in the first game.

I managed to do this without using the crib sheet provided for reviewers, though my solution meant I didn't have the time to get the watch. Again a hydrogen bomb or laser beam would have been more realistic than purporting to use the starship's low thrust engines, but the next stage gets even more unlikely.

The authors cite their inspiration as "Deathworld" by Harry Harrison and "Hothouse" by Brian Aldiss. Both books describe worlds in which the flora and fauna have become misanthropic (there are however no mutant camels).

Now Hothouse is an extremely depressing book because the hero spends most of the time under the influence of a brain-symbiotic fungus, a moral, that is supposed to have been the cause of male aggression – whatever the problem it always has to "do something".

Consequently on entering the jungle I was reluctant to get the Fish Fungus and also thought that a seed that could swallow me would make a better boat than a tuber (I tried it with my dahlias – they sank and have now rotted).

I eventually managed to get across the river (and into the maize – an old joke) and struck out for the city of Enoch which is linked to a geo-stationary space factory by space elevator (see "Fountains of Paradise" by Arthur Clarke). Now space elevators are pie in the sky – again totally uneconomic – and down on the ground are the equally unlikely robots of Isaac Asimov.

Way back in 1940 Asimov invented his classic three laws of robotics and then spent 20 lucrative years showing how ludicrous they are. In "The Naked Sun" he finally pinned down the impossibility of the first law – namely how does a robot know whether something is harmful to a human being and what is a human being anyway?

So it's no surprise that the robots will give you a hard time and a lot of puzzles and problems – Level 9 have kept up their high standards so go and buy it with a large pinch of salt (to get the SEE BEE → I don't see any SEED around here).

Duneroamin

NOW if you really want a realistic planetary adventure then try Duneroamin (Canoworms). Despite appearances this is an epic game and also illustrates a practical problem in logistics.

You are at your base on the equator of the planet Arrakis, a planet orbiting the star Canopus (second brightest, F-type, 97 degrees past Aries by 53 degrees south).

You have received a Mayday call from the survivor of a ship which has crashed somewhere else on the equator. In order to attempt a rescue you have collected 23 cans of fuel and have half a tank of fuel in your dune buggy – a remarkable vehicle that can travel 8000 kms on one full tank and carry one can to refill the tank.

How you managed to obtain all this fuel has been omitted from the game, nevertheless it retains a number of features. You can Save and Restore any position, have multiple commands plus Again to save typing.

You can Look at any location but the essential commands are Get or Drop a can of fuel and travel East or West.

Your task is to find and pick up the survivor and return to base. Note that the circumference of the planet is 40,000 kms and the survivor's location is "interactive" – that is, it depends on what you do.

Those who like graphical games could try colouring the bottom of the screen yellow and the top blue, with the occasional cloud to indicate direction of travel. It is a help to say how many fuel cans are visible at a fuel dump (or draw them on the screen) but the best explorers always keep a diary.

The dune buggy can travel 2000 kms per day so you could start the search with:

SGWDE
GGEEDWW
A

which will drop one can 2000 kms West and two cans 4000 kms East. Note that refuelling is automatic when the tank is empty and you have a can.

The solution I know requires 85 days to find the survivor. Longer than that and you might as well quit (with a Restore) or commit suicide with a sandworm.

Astronomical adventure?

ONE interesting little adventure the editor posed me was Starfinder by R. Alpiar and H. Couper (Century). It's a fascinating naked eye astronomy program, but how it fits into an adventure column defeats me. I think he probably mistook astronomy for astrology.

Still, it lets me pontificate about a pet subject. Return to Eden put me in the mood.

Before buying an astronomy program it is useful to understand some of

Duneroamin listing

```
   10 DIM S(19),R(19),SS(19),SR(19)
   20 FOR I= 1TO 19
   30 S(I)=0
   40 R(I)=0
   50 NEXT
   60 S(0)=23
   70 R(0)=1
   80 R=0
   90 P=0
  100 T=0.5
  110 C=0
  120 A$="L"
  130 INPUT CC$
  140 IF CC$="A" THEN CC$=A$ ELSE A$=
CC$
  150 FOR M=1 TO LEN(CC$)
  160 C$=MID$(CC$,M,1)
  170 IF C$="L" THEN 590
  180 IF C$<>"S" THEN 280
  190 FOR I=0 TO 19
  200 SS(I)=S(I)
  210 SR(I)=R(I)
  220 NEXT
  230 SR=R
  240 SP=P
  250 ST=T
  260 SC=C
  270 GOTO740
  280 IF C$<>"R" THEN 380
  290 FORI=0 TO 19
  300 S(I)=SS(I)
  310 R(I)=SR(I)
  320 NEXT
  330 R=SR
  340 P=SP
  350 T=ST
  360 C=SC
  370 GOTO 590
  380 IF C$<>"G" THEN 430
  390 IF S(P)=0 OR C=1 THEN 760
  400 S(P)=S(P)-1
  410 C=1
  420 GOTO680
  430 IF C$<>"D" THEN 480
  440 IF C=0 THEN 760
  450 S(P)=S(P)+1
  460 C=0
  470 GOTO 740
  480 IF C$<>"E" THEN 540
  490 IF T<0.2 THEN 760
  500 T=T-0.25
  510 P=(P+1) MOD 20
  520 PRINT"You travel 2000 kms East"
  530 GOTO590
  540 IFC$<>"W" THEN 760
  550 IF T<0.2 THEN 760
  560 T=T-0.25
  570 P=(P+19) MOD 20
  580 PRINT"You travel 2000 kms West"
  590 PRINT"You are ";
  600 IF P<10 THEN PRINT; P*2000" kms
 East";ELSE PRINT; (20-P)*2000" kms W
est";
  610 PRINT" of base."
  620 IF S(P)=0 THEN S$="nothing" ELS
E S$="a fuel dump"
  630 PRINT"You can see ";S$;" and ca
n travel ";(T+C)*8000;" kms"
  640 IF R(P)<>0 THEN 680
  650 R(P)=1
  660 R=R+1
  670 IF R=19 THEN PRINT"However you
dig around and find the survivor"
  680 IFP=0 AND R=19 THEN PRINT"Missi
on accomplished":END
  690 IFS(P)+C+T=0 THEN PRINT"Out of
fuel-you are a Sandworm sandwich":END
  700 IFT>0 OR C=0 THEN 740
  710 PRINT"You refill the dune buggy
"

  720 T=1
  730 C=0
  740 NEXT
  750 GOTO130
  760 PRINT"You can't do that"
  770 CC$="L"
  780 GOTO150
```

MONITOR THE REDUCTION ON OUR HIGH RESOLUTION.

HIGH RESOLUTION
JVC COLOUR MONITOR
NOW ONLY
£199.95
(INC. VAT.)
48 HOUR DELIVERY

We've reduced the price of our RGB high resolution colour monitor (580 x 470 pixels) to only £199.95 – that means you save £50 on our previous offer – and that includes VAT, leads and carriage.

And just because you're saving on price doesn't mean you're sacrificing quality. Here's what Acorn User had to say about our monitors.

"..Gave steadier pictures than the Microvitec Club, and the colours were rather better.

It seems that all 'normal' and 'medium' resolution monitors, including the Sanyo, are simply inadequate to deal with the Beeb's graphics and text output.

The JVC was excellent, giving clear, legible results.

Was the JVC better than the Microvitec?* Would I buy one? Yes to both questions."

MODEL REFERENCE	1302-2 High Resolution
RESOLUTION	580×470 Pixels
C.R.T.	14"
SUPPLY	220/240v, 50/60Hz.
E.H.T.	Minimum 19.5kv Maximum 22.5kv
VIDEO BAND WIDTH	10MHz.
DISPLAY	80 characters by 25 lines
SLOT PITCH	0.41mm
INPUT: VIDEO	R.G.B. Analogue/TTL Input
SYNC	Separate Sync on R.G.B. Positive or Negative
EXTERNAL CONTROLS	On/off switch and brightness control

The unit has a 14" screen and is suitable for the BBC Micro, Electron, Sinclair QL, Lynx, Oric, Apple, IBM, Amstrad and RML 480Z and most other leading micros.

And there's a two year full guarantee – a year longer than any other company offers.

If you order your monitor by post, you'll receive it within 48 hours by courier service.

Simply post the coupon below to: Opus Supplies Ltd., 158 Camberwell Road, London SE5 0EE. Or by telephoning 01-701 8668 quoting your credit card number. Or, of course, you can buy at our showroom between 9.00 – 5.30 pm, Monday – Friday.

*Microvitec Cub 14" Monitor.

To: Opus Supplies Ltd., 158 Camberwell Road, London SE5 0EE.

Please send me: ____________ High Resolution Colour Monitor(s) at £199.95 (inc. VAT)

I enclose a cheque for £____________ Or please debit my credit card account with the amount of £____________ My Access/Barclaycard (please tick) no. is ____________

Please state the name of your computer ____________

Name ____________

Address ____________

____

Postcode ____________

Telephone ____________

Opus.
Opus Supplies Ltd.

BU11

From Page 81

this ancient science.

To our eyes the sky at night appears to consist of many hundred fixed points of light (called stars) through which seven objects appear to wander – the Sun, Moon and the five planets Mercury, Venus, Mars, Jupiter and Saturn.

The days of the week are named after these seven objects and it is a great pity that the eighth planet, Uranus, is just on the limit of the naked eye observation because we should really have an octal week, count on our octal fingers and binary thumbs and never had to adopt the French metric system.

The most obvious of the seven wanderers is the Sun. This G2 star follows the same path through the "fixed" star background almost exactly once a year.

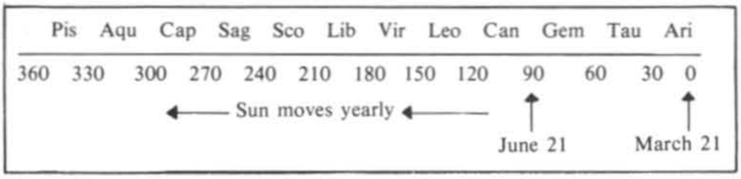


Figure I: Apparent movement of the sun along the ecliptic

This path is called the ecliptic and the position of the Sun at the spring equinox (on or about March 21 when the day and night are of equal length) is called the first point of Aries. It is from this point, now actually in the constellation of Aquarius, that the position of all celestial bodies is measured.

The Sun's position is the simplest to define. Consider Figure I, where the ecliptic has been split up into the more familiar 12 zones of the Zodiac, each zone equal to 30 degrees.

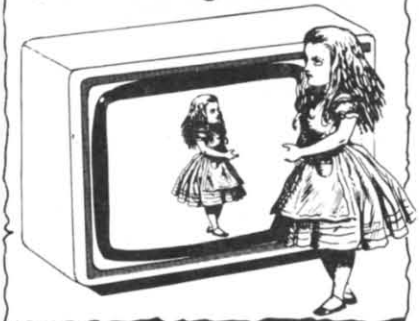
An important point to appreciate is that although the Sun appears to rise in the east and set in the west (due to the earth's rotation) it also appears to move in the opposite direction against the star background (due to the earth revolving round the Sun).

This west to east movement is, on the

Starfinder listing

```
   10 REM SUN,PLANETS ECLIPTIC LONG.
   11 REM ON GIVEN DAY,MONTH,YEAR
   20 DIM P$(8),P(8),L75(8),L(8),E(8)
,S(8),INC(8),NOD(8),Z$(12)
   30 FOR p=1 TO 8:REM READ PLANET DA
TA
   40   READ P$(p),P(p),L75(p),L(p),E
(p),S(p),INC(p),NOD(p)
   50 NEXT p
   60 FOR Z=0 TO 12
   70   READ Z$(Z)
   80 NEXT Z
   90 K=180/PI
  100 GOTO 190
  110 DEF PROChelio(Period,Long75,Lon
gPeri,Eccen,Semajaxis)
  120  Np=(360*DAYS/(365.25*Period))
MOD 360
  130  IF Np<0 THEN Np=Np+360
  140  lg=(Np+360*Eccen/PI*SIN(RAD(Np
+Long75-LongPeri))+Long75) MOD 360
  150  IF lg<0 THEN lg=lg+360
  160  r=Semajaxis*(1-Eccen*Eccen)/(1
+Eccen*COS(RAD(lg-LongPeri)))
  170 ENDPROC
  180 REM Program loop
  190 REPEAT
  200  INPUT"DATE  D.H,M,Y ",DAY,MONT
H,YEAR
  210  LEAPYEAR=YEAR-INT(YEAR/4)*4
  220  D=INT((MONTH+1)*30.61)-63
  230  IF LEAPYEAR=0 THEN D=D+1
  240  IF MONTH=1 THEN D=0
  250  IF MONTH=2 THEN D=31
  260  DAYS=(YEAR-1875)*365+INT((YEAR
-1873)/4)+D+DAY-36525
  270  IF DAYS<-27333 THEN DAYS=DAYS+
1:REM 1900 NOT LEAP YEAR
  280  PRINT"DAYS=";DAYS
  290  PROChelio(1,99.53431,102.51044
,0.01672,1):REM EARTHS POSITION
  300  L=lg
  310  R=r:REM THEREFORE SUN IS AT
  320  IF L>180 THEN SUN=L-180 ELSE S
UN=L+180
  330  SUN=INT(SUN)
  340  PRINT"Sun      ";SUN;" ";Z$(INT
(SUN/30));SUN MOD 30
  350  REM CALCULATE LG OF PLANETS
  360  FOR p=1 TO 8
  370    PROChelio(P(p),L75(p),L(p),E
(p),S(p))
  380    MU=ASN(SIN(RAD(lg-NOD(p)))*S
IN(RAD(INC(p))))*K
  390    lgd=ATN(TAN(RAD(lg-NOD(p)))*
COS(RAD(INC(p))))*K+NOD(p)
  400    IF lgd>lg THEN CR=-180 ELSE
CR=180
  410    IF ABS(lgd-lg)>90 THEN lgd=l
gd+CR
  420    IF ABS(lgd-lg)>90 THEN 410
  430    rd=r*COS(RAD(MU))
  440 REM Transfer to the ecliptic
  450    PE=ATN(R*SIN(RAD(lgd-L))/(rd
-R*COS(RAD(lgd-L))))*K+lgd
  460    IF p<3 THEN PE=180+L+ATN(rd*
SIN(RAD(L-lgd))/(R-rd*COS(RAD(L-lgd))
))*K
  470    PE=INT(PE MOD 360)
  480    IF PE<0 THEN PE=PE+360
  490    PRINT P$(p);PE;" ";Z$(INT(PE
/30));PE MOD 30
  500  NEXT p
  510 UNTIL FALSE
  520 REM Data on planets for Jan 0 1
975
  530 DATA"Mercury "
  540 DATA0.24085,320.66305,77.06645,
0.205629,0.387099,7.00427,48.03493
  550 DATA"Venus   "
  560 DATA 0.61521,310.97453,131.2192
8,0.006785,0.723332,3.39438,76.45475
  570 DATA "Mars    "
  580 DATA 1.88089,249.62919,335.5988
1,0.093382,1.523691,1.84983,49.36466
  590 DATA "Jupiter "
  600 DATA 11.86224,355.21414,13.9199
2,0.04846,5.202804,1.3045,100.19608
  610 DATA "Saturn  "
  620 DATA 29.45771,104.17278,92.5583
3,0.05563,9.538844,2.48933,113.43842
  630 DATA "Uranus  "
  640 DATA 84.01247,205.78286,170.254
72,0.04725,19.181854,0.77316,73.87283
  650 DATA "Neptune "
  660 DATA 164.79558,249.91462,44.405
92,0.008586,30.05796,1.77236,131.5050
6
  670 DATA "Pluto   "
  680 DATA 246.378,200.3345,224.258,0
.246115,39.29976,17.14451,109.9965
  690 DATA " Ari"," Tau"," Gem","Can"
,"Leo","Vir","Lib","Sco","Sag","Cap",
"Aqu","Pis","Ari"
```

Alice through the VDU



Our monthly foray into Adventure games

From Page 83

whole, true also for the Moon and planets, and can be seen in "real time" when the Moon eclipses the Sun or a star.

Apart from this general movement however the Moon and planets do not stay on the ecliptic but tend to wander above and below it by a few degrees or so. Therefore their position is defined as their longitude (how far to the left of the first point of Aries) and their latitude (how far above or below the ecliptic).

To calculate where the planets appear to be is done in three stages.

- We have to know where they were, relative to the Sun's (or helio) point of view, on a given date plus their period of revolution around the Sun, the eccentricity of their orbit, where the long axis of their elliptical orbit is, etc.
- From this information we can apply some simple celestial mechanics, developed by Kepler and Newton, to calculate where the planets were or will be in their orbits, at a chosen date.
- Finally we move the point of view from the Sun to where we have calculated the Earth must be in its orbit – some simple trigonometry suffices but note that all we need to do for the Sun's position is to add or subtract 180 degrees to the earth's longitude since, from the 'helio' point of view, the Earth also moves along the ecliptic but is out of phase by 180 degrees.

I have written a simple program to perform these calculations based on the date and planetary data of Jan 0 1975. It is simple because it only calculates the longitude of the planets and omits the Moon (which gave even Newton a headache and is calculated by different formulae anyway).

Nevertheless it is accurate to about two or three degrees per century and adequate for naked eye location and identification.

To test that it is working enter the date as 6pm GMT on March 21 1972 thus: 21.75,3,1972

The result should be as in Table I.

Drawing this result onto just the first quarter of the ecliptic we get the picture shown in Figure II.

```
DAYS=-1014.25
Sun          2    Ari2
Mercury     16    Ari16
Venus       46    Tau16
Mars        57    Tau27
Jupiter    275    Cap5
Saturn      62    Gem2
Uranus     197    Lib17
Neptune    244    Sag4
Pluto      182    Lib2
```

Table I

What this means is that if we had looked to the west at 6pm on that date we should have seen the Sun setting almost exactly due west (because it was just past the equinox) with the planets Mercury, Venus, Mars and Saturn strung out from the Sun roughly along the line the Sun had just followed in the previous four hours.

This was indeed the case because about then was the only time I have ever seen the planet Mercury and I well remember the position of the other planets.

The Starfinder program can be set to any location on the Earth's surface and to any date in this century. You also have a choice of view direction – eight horizontal and one vertical. So I set it to look west on March 21 1972 at 6pm and up came the well remembered view.

The next request was to look south at 11pm on the same day and also display the stars this time. The view of the Orion constellation was easily recognisable with Sirius showing up as the brightest star.

Of particular interest at the moment is the planet Venus, the bright evening star. With practice you can spot it during the day and binoculars will reveal its crescent shape.

The program is written in Basic with most of it devoted to handling the graphics. A booklet contains a listing of the program plus an explanation of how to run it and also access the stellar information. About 500 stars can be displayed and identified with Achernar and Canopus particularly prominent.

I think it is an ideal introductory program for anyone interested in naked eye astronomy and unable to wait for Patrick Moore's Almanac to come out each year. A bit slow but I happily played with it for hours and now await a digital watch that will supply the same information for half the price.

Alice

SOLUTIONS ...to the Tintin problem (December 1984) and Bricks (January 1985)

Tintin and the ladders: Having had no solution to the monkeys and the coconuts I have had too many in this case. Briefly Pythagoras is enough to show that the right hand ladder is the longer and, by solving a cubic equation, that TinTin runs at 18.31 - - ft/sec. In order to tie break:

(1) The ladders are 87 and 105 inches long and cross at 38 inches high. How wide is the alley?

(2) TinTin runs completely round the carriage in the time it takes to roll 88ft at constant velocity (that is 10 seconds). How fast does he now run?

Neither program requires solving a cubic equation.

Dropping Bricks: Again too easy. If you have left five bricks in the caves in 24 moves (using all the cards) then your program is probably correct. Now change CARD 2 to:

DROP,E,3 else E,5

that is, DON'T pick up the brick this time. Your program should now take considerably longer to stop. How fast is it?

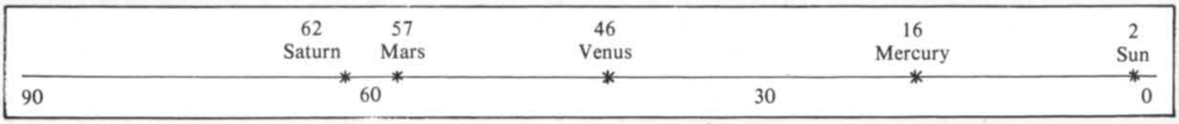
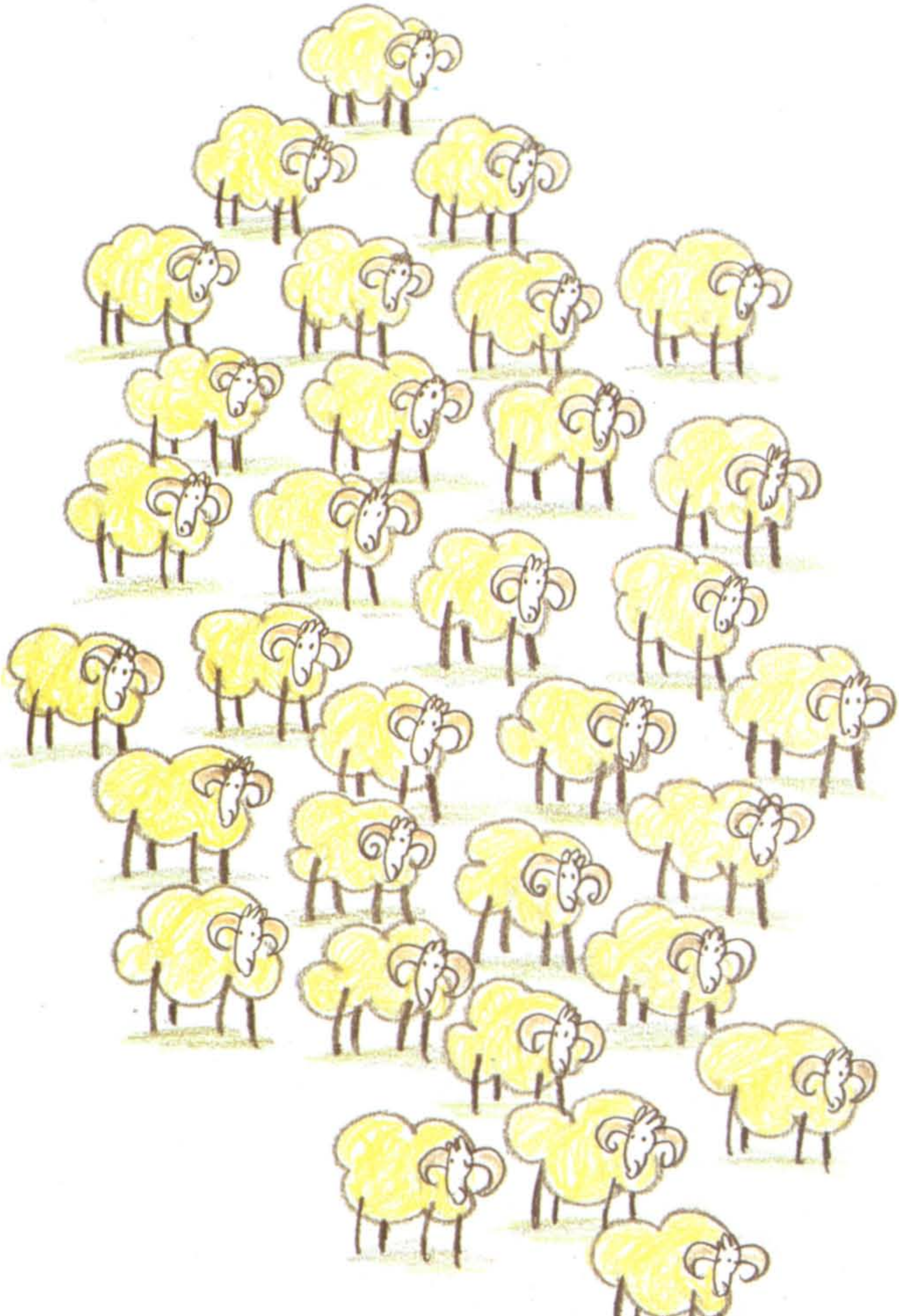


Figure II: Position of planets along the ecliptic at 6pm GMT, March 21 1972

Your standard BBC Micro will have this many RAMs.



Upgrade your BBC Micro
and you'll have this

And they'll be IBM PC

That's right, a massive 256 Kilobytes of Random Access Memory, plus hardware and disc compatibility with the U.K.'s number one personal computer, the IBM®PC.

Just think of the potential for your Model B. The opportunity to explore the vast range of IBM®PC compatible programming aids, languages and business software packages, which are already established as 'State of the Art' and are destined for a growth pattern previously unknown in the Industry.

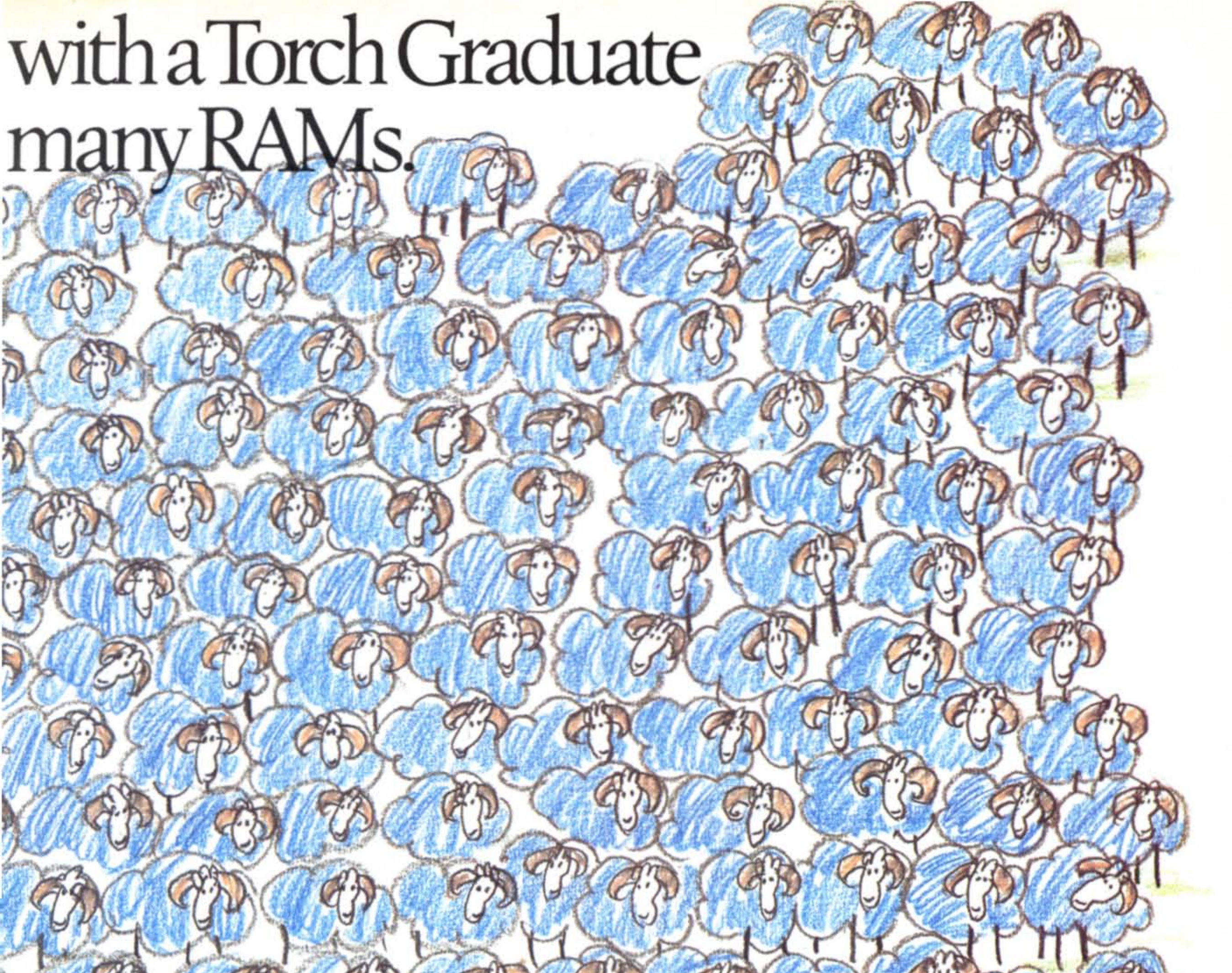
To take full advantage of this high calibre software support the Torch Graduate incorporates twin 360K floppy disc drives and two IBM®PC compatible expansion slots, thus making available options such as local area networking, ideal for business and educational applications or auto-dial/auto-answer comms modems, linking up with viewdata and electronic mail services such as Prestel and Telecom Gold.

As an added bonus, we even start you on your way with the PSION XCHANGE integrated software package comprising, word processing, financial planning, graphics and database management programs, specifically developed for the colour version IBM®PC.

BBC Model B owners, this is your day of reckoning!

Torch Computers, dedicated to the BBC Micro in more ways than one.

with a Torch Graduate many RAMs.



compatible.

Technical Specification • 8088 16-bit CPU (5Mhz) • 256K RAM • MS™-DOS operating system customised to IBM PC compatibility • Twin double sided, 5 ¼" floppy disc drives (each 360K formatted) • 2 IBM PC compatible expansion slots • Free PSION XCHANGE software (Abacus, Easel, Archive, Quill) • Software compatibility allows Lotus 1-2-3 and all popular IBM® PC business programs to run without modification, subject to constraints of BBC keyboard and display • Acorn Disc interface is not required • Keyboard, text and graphics by BBC Model B Micro.

For the name of your local Torch Graduate dealer complete the reader enquiry card or ring (0223) 841000.
Torch Computers Ltd., Abberley House, Great Shelford, Cambridge CB2 5LQ.

Torch Graduate

TORCH COMPUTERS

IBM® is the registered Trade Mark of International Business Machines. The BBC MICRO is designed, produced and distributed by Acorn Computers Limited. The Graduate is manufactured by Torch Computers under licence from Data Technologies Ltd.

KEMPSTON
MICRO ELECTRONICS LTD

...Let your BBC play the game...

KEMPSTON BBC PRO JOYSTICK

This new joystick has been designed to complement the BBC Computer in both style and performance.

Based on the best selling Competition Pro 5000 series, the BBC Pro Joystick contains micro switches allowing movement in a total of eight directions together with twin fire buttons for left and right handed play.

The joystick is moulded in cream and brown and plugs directly into the analogue port ensuring compatibility with a wide range of existing BBC software without the need for expensive interfaces.

ALSO AVAILABLE PRINTER CABLE

Available directly from Kempston Micro Electronics Ltd · Singer Way · Woburn Road Industrial Estate · Kempston · MK42 7AF · Tel (0234) 856633 · Telex 826078 KEMPMI G · Please send me:-

BBC Pro Joystick .... £16.95 ☐ Printer Cable .... £13.50 ☐

Access/B.Card ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

I enclose a cheque/P.O. for £ ....

Name/Address ____________

____

Signature ____________ P/code ____________

All prices include VAT P&P
Overseas add £4.00 P&P

Part 23 of MIKE BIBBY's introduction to programming

Juggle with letters, and root out that felonious Bibby (or was it Bibi?)

THIS month we're going to look at one of my favourite subjects – string manipulation. Despite its formidable name it really is thoroughly enjoyable – I always look on it as juggling with letters.

First though, let's do some quick revision on strings.

```
10 REM PROGRAM I
20 MODE 6
30 first$ = "Good"
40 second$ = "Morning"
50 PRINT first$;" ";second$
```

Program I

Program I couldn't be simpler. It prints out "Good Morning" in a rather roundabout way using two strings.

Look carefully at line 50. We've had to insert a space between the strings and the whole thing is glued together with semi-colons.

Program II does exactly the same thing but this time we concatenate – or add – our strings together.

The "+" simply tags one string onto the end of another. I build up the "Good Morning" in *greeting$*.

Notice how I put the space in *space$*. This is good practice since if I use *space$* throughout the program and later want to change it to give two spaces between strings instead of one, I only have to alter the definition of *space$* in line 50.

```
  10 REM PROGRAM II
  20 MODE 6
  30 first$ = "Good"
  40 second$ = "Morning"
  50 space$ = " "
  60 greeting$ = first$ + space$ +
second$
  70 PRINT greeting$
```

Program II

Program III reminds us of an important idea – the null string. This is a string that contains absolutely nothing at all, not even nothing.

If you like, the null string is the equivalent of the numeric variables' "0". We signify the null string as two quotes with absolutely nothing in between as in line 60. Notice how it differs from a space – line 50.

```
  10 REM PROGRAM III
  20 MODE 6
  30 first$ = "Good"
  40 second$ = "Morning"
  50 space$ = " "
  60 null$ = ""
  70 greeting$ = first$ + space$ +
second$
  80 PRINT greeting$
  90 greeting$ = first$ + null$ +
second$
 100 PRINT greeting$
```

Program III

The nice thing about concatenating strings like this is that combined with loops, you can build up new strings. Program IV shows how you can build up the alphabet.

```
  10 REM PROGRAM IV
  20 MODE 4
  30 alphabet$ = ""
  40 offset% = 64
  50 FOR loop% = 1 TO 26
  60 alphabet$ = alphabet$ + CHR$(
offset% + loop% )
  70 PRINT alphabet$
  80 NEXT loop%
```

Program IV

You've got to watch it though, because the BBC Micro has a very wasteful way of using memory to store strings.

It behaves rather like a man who because he's bought one book, builds a bookcase capable of holding just that one book.

When he then gets another book, he has to build another bookcase to hold them both. Of course when he gets the third book, he then builds one that holds exactly three – and so on. Most uneconomic.

This is similar to the way the BBC Micro handles the string *alphabet$* as it is built up in Program IV. If you like, it stores A, then next time through finds a new place in its memory to store AB, then a new place for ABC. Again, extremely wasteful.

Program V shows the sort of thing that can happen if you're not careful. As the strings build up they waste so much space that the program crashes with a "No room" message.

```
10 REM PROGRAM V
20 MODE 1
30 REPEAT
40 string1$ = string1$ + "A"
50 string2$ = string2$ + "B"
60 string3$ = string3$ + "C"
70 UNTIL LEN( string2$ ) = 255
```

Program V

This can be really irritating, particularly as unlike most of our other faults, it doesn't show itself immediately

→

From Page 89

but waits for a while. In larger programs this can be a devil to find.

Program VI shows how to get round this problem. Lines 30 and 40 build "bookcases" of the required size by setting *string1$*, *string 2$* and *string3$* to their maximum size with STRINGS – and then immediately "emptying the shelves" by setting each string to the null string.

What happens is that the micro allocates enough space to take the largest values of the strings at the start of the program.

So, as the string is built up in the loop it can fit within this reserved space and the micro doesn't have to keep on grabbing more memory to house the ever-increasing strings.

```
   10 REM PROGRAM VI
   20 MODE 1
   30 string1$ = STRING$( 255." "):
 string1$ = ""
   40 string2$ = STRING$( 255," "):
 string2$ = ""
   50 string3$ = STRING$( 255." "):
 string3$ = ""
   60 REPEAT
   70 string1$ = string1$ + "A"
   80 string2$ = string2$ + "B"
   90 string3$ = string3$ + "C"
  100 UNTIL LEN( string2$ ) = 255
```

Program VI

Program VII shows how Program IV can be modified to take these ideas into account. Though it's not particularly fruitful in this instance, it's always useful to get into good programming habits.

```
   10 REM PROGRAM VII
   20 MODE 4
   30 alphabet$ = STRING$( 26, " " )
   40 alphabet$ = ""
   50 offset% = 64
   60 FOR loop% = 1 TO 26
   70 alphabet$ = alphabet$ + CHR$(
 offset% + loop% )
   80 PRINT alphabet$
   90 NEXT
```

Program VII

One last point – don't forget that to find out how long say, *string$* is, you just have to use LEN ( ) as in:

```
PRINT LEN( string$ )
```

Right, revision over, and you've behaved impeccably. String manipu-

lation next – have a look at Program VIII:

```
   10 REM PROGRAM VIII
   20 MODE 6
   30 string$ = "ABCDE"
   40 PRINT LEFT$( string$, 1 )
   50 PRINT LEFT$( string$, 2 )
   60 PRINT LEFT$( string$, 3 )
   70 PRINT LEFT$( string$, 4 )
   80 PRINT LEFT$( string$, 5 )
```

Program VIII

Great, isn't it? LEFT$ is a Basic keyword which allows you to chop off or slice *string$* up.

The slice you get starts at the very left of the string you're talking about and consists of the number of characters specified after the comma.

So LEFT$(string$, 4) will give you the first four – or LEFTmost four – characters of *string$*.

That is:

```
PRINT LEFT$( "WORD", 1 )
```

will give you:

```
W
```

whereas:

```
PRINT LEFT$( "WORD", 3 )
```

will give you:

```
WOR
```

I don't think Program VIII will hold any problems for you now, but try and see what happens with:

```
35 PRINT LEFT$( string$, 0 )
```

and

```
90 PRINT LEFT$( string$, 6 )
```

That is, try LEFT$ specifying no characters at all and also specifying more characters than you've got in your string.

Program IX illustrates the use of LEFT$. You input a string – *string$* – and say how many characters starting from the left you want. Line 100 then prints the slice out.

```
   10 REM PROGRAM IX
   20 MODE 6
   30 REPEAT
   40 INPUT '"string$", string$
   50 UNTIL string$ <> ""
   60 REPEAT
   70 INPUT '"How many characters",
character%
   80 UNTIL character% > 0 AND
character% < LEN(string$) + 1
   90 PRINT '"LEFT$( "; string$ ;", ";
character%;" ) is :- "
  100 PRINT 'LEFT$( string$,
character% )
```

Program IX

Program IX has some nice ideas – notice how lines 30-50 form a REPEAT . . . UNTIL loop with a *condition :* you keep on INPUTting UNTIL *string$* is NOT the null string – line 50. This stops someone from just pressing Return.

More interestingly, lines 60-80 form another REPEAT . . . UNTIL loop, this time ensuring that *character%* is NOT 0 AND *character%* is not too large – that is, over the length of the string.

If you examine line 80, you'll see that we're using the keyword AND.

This is the same sort of creature as the OR we used last month. In that case we did something IF *one condition were true* OR *a second condition were true.*

In the case of AND we want both conditions to be true before we do anything. That is, we do whatever it is IF *the first condition is true* AND *the second condition is true.*

The point is, *they both have to be true at once.*

In the case of line 80, we keep on repeating UNTIL *character$ <> 0* AND *character$ < LEN(string$) + 1* – that is – until the slice we want is non-zero and not over-length.

I think you'll agree, the AND works much as it reads – not hard at all.

I hope the *LEN(string$) + 1* hasn't foxed you. If we said " *< LEN (string$)*" we'd be excluding the last character of the string. Hence we add one to it – "less than the last character in the string plus one" means the last character is included in, as our

American cousins say.

Another way round it would be to say *"AND character% <=LEN(string$).*

One last point about AND. If you want to do something if *A%* is greater than 0 AND less than 11 – that is, in the range 1 to 10 – you have to spell both conditions out in full:

```
IF A% > 0 AND < 11 THEN PRINT "In
range"
```

will not do, even though it reads alright. You have to say:

```
IF A% > 0 AND A% < 11 THEN PRINT "In
range"
```

The same holds for OR.

You may be wondering why you'd want to use LEFT$ ... The answer is that it's one of those things that the more you use it, the more uses you find for it and the less you can imagine doing without it.

One of its main uses is when we're dealing with a lot of records. A set of records – not matter of what – is called a file, and the reasoning behind the way the records have been written – the method in the madness – is called the database.

Now the police might wish to examine their file for the convictions of one known felon Mike Bibby – or is it Bibbie or Bibbey or Bibi? A tricky name to spell, that.

Even if the investigators know the right spelling, it might have been misspelled when it was put onto the file. So what do we do?

The answer is to examine the surname file in a big loop, reading each surname in turn into *name$* – and tell the computer:

```
IF LEFT$( name$,3) = "BIB" THEN PRINT
name$
```

We're ignoring capital/lower case differences.

That is, we look at only the first three letters of each *name$* to see if they fit the pattern. If so, we print that *name$* out – and all the other information, of course.

All right, doing it this way we get all the BIBBINGHAMS, BIBBLETON-SMYTHES and other criminal elements who we don't want, but we also catch in our nett the nefarious BIBBY, BIBI or however he was spelt.

In computer terms we have searched our file looking for a match on the first three letters.

And we did it with LEFT$.

In practice of course, there's a lot more to it than that, but that's the gist of what goes on.

However computers are only as good as the information you put into them and far too often we distort the data so the micro can accept it.

You must have come across the type of form – obviously designed so that the information can be later stored in a computer – that insists on you putting each letter of your name and address in a separate box.

There are never quite enough boxes are there? It must be a nightmare for those with double-barrelled names.

Anyway the computer deals with exceptions the way old Procrustes dealt with his guests – if they didn't fit his bed, they were stretched or shortened until they did.

Often when dealing with records, we like to make them all the same length – it makes life a lot easier when handling them.

Program X shows how the micro handles this sort of thing. In this example we're going to read in a series of names from the DATA statement – line 160 – and then print them out. In practice we'd store them on tape or disc – insisting that they're all exactly five characters long.

This is easy enough if they're five or more characters long already – we simply use LEFT$ and specify five characters.

But what if they're under five?

The answer is that we pad them out by adding spaces to the end.

To save any complicated calculations as to how many spaces we should add to each one, we adopt a brute approach. Since the maximum number of characters we can have is five – line 40 – we define *pad$* – line 50 – a string of exactly five spaces.

At the same time, remembering my memory-conservation intentions I give *data$* the maximum size I reckon it'll need – line 60.

I then use a loop – 70 to 120 – to read the names into *data$* one by one.

Then I simply add the padding string to it – line 90 – and cut it down to size with LEFT$ – line 100 – before storing each string in the relevant *name$()*.

Finally I print them all out – nose to tail – to prove they really are all five characters long.

Incidentally, have you noticed how good I've been? Although I'm dealing with six different names, I used:

```
DIM name$(5)
```

and used *name$(0)* to store the first name in. Waste not, want not.

```
 10 REM PROGRAM X
 20 MODE 6
 30 DIM name$(5)
 40 max_char% = 5
 50 pad$ = STRING$( max_char%," " )
 60 data$ = STRING$( 20, " ")
 70 FOR loop% = 0 TO 5
 80 READ data$
 90 data$ = data$ + pad$
100 data$ = LEFT$( data$, max_char%
)
110 name$( loop% ) = data$
120 NEXT loop%
130 FOR loop% = 0 TO 5
140 PRINT name$( loop% );
150 NEXT loop%
160 DATA KATHRYN, PAUL, CAROLE,
ALAN, KEV, PETER
```

Program X

There are lots more ways to use LEFT$ but I reckon the best is to print out triangles of asterisks.

I firmly believe that someone who can print out triangles of asterisks in a multitude of ways is well on their way to being a good programmer.

Anyway, Program XI shows how I use LEFT$ to accomplish the feat. Can you turn the triangle upside down?

```
10 REM PROGRAM XI
20 MODE 6
30 asterisk$ = STRING$( 20, "*" )
40 FOR loop% = 1 TO 20
50 PRINT LEFT$( asterisk$, loop%)
60 NEXT loop%
```

Program XI

Well, that's finished with LEFT$. Next month it's – yes, you've guessed it – RIGHT$!

A full LOGO for the BBC model "B" from Logotron.

Logotron LOGO, an LCSI Standard Logo, is now recognised as the fastest and most powerful implementation of Logo available on the BBC Model "B". Copies are now being despatched from stock to satisfied customers around the country.

Logo is a computer programming language which appeals equally to children in primary school and to computer scientists at the Massachusetts Institute of Technology. Logotron LOGO is being bought by:

LOGOTRON LOGO LEADS THE WAY!

Parents who want to keep up with their computer-literate children, but thought they were too old to learn a programming language;

Parents and teachers who are fed up with BASIC and depressed at the poor quality of most educational and recreational software;

Computer users of all ages who are looking for a simple yet powerful introduction to tomorrow's world of artificial intelligence;

Teachers who are looking for ways of helping children with special needs, who may be dyslexic, autistic, or just unusually intelligent.

Logotron LOGO is being used to drive robots, create animated games, create a new generation of educational software, and introduce computing to a new and sophisticated breed of computer user.

The software is contained on a single 16k ROM, and is infinitely flexible through the creation of disk-based extension modules. The manual, contained in a handsome loose-leaf binder and library case, provides all the information needed to write your own software, whether you are a veteran programmer or a total novice.

Educational users can take advantage of a special 'Classroom Pack' introductory offer, open until 31 March 1985, which consists of 10 LOGO ROMS, one full set of manuals and 10 mini-manuals for only £300 (plus £40.51 VAT). Less than half the unit cost of a single system.

LOGO
BBC'B'
LOGO
£10 FREE VOUCHER
AND FREE POST & PACKAGING**

LOGOTRON

Logotron Limited, 5 Granby Street, Loughborough, Leicestershire LE11 3DU.

To: Logotron Limited, 5 Granby Street, Loughborough, Leicestershire LE11 3DU. ☐ Please send me ______ Qty. Logotron LOGO(s) for the BBC Model "B" at £67.34 (inc. VAT) each and my FREE £10 voucher (Redeemable against future purchases of Logotron software and hardware). I understand postage and packaging are free.** ☐ Please send me further information concerning Logotron's LOGO for the BBC Model "B". ☐ Please send me further information concerning classroom packs. ☐ tick as applicable.

I enclose a cheque/postal order for £ __________ payable to Logotron Limited (Delete as necessary). NAME __________

ADDRESS __________ POST CODE __________

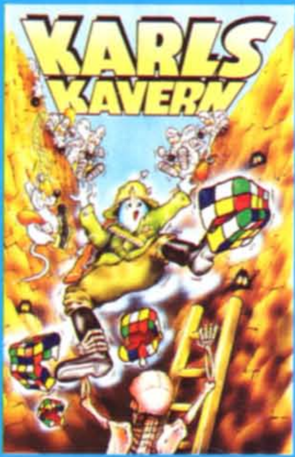
☐ Home User; ☐ Educational User; ☐ Computer Manufacturer*; ☐ Distributor* *attach to company letterhead. M.U.

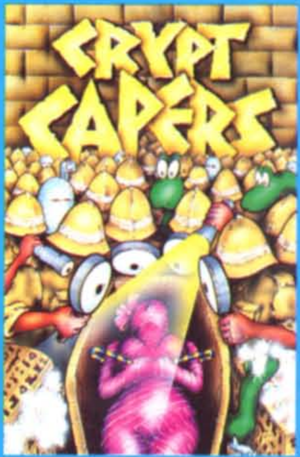
**The £10 voucher and free postage and packaging are available only to customers who enclose payment with their order.

Trade enquiries welcome.

EXCLUSIVE OFFER!
3 for the price of 2

MANIC MINER





This exclusive offer gives you the chance to enlarge your Software Projects games collection from any of these six games. Whether it is the all time, award winning classic, "Manic Miner", or escaping from maurauding animals in "Nutcracka", to searching deep pyramids in "Crypt Capers", this exclusive offer gives you the opportunity to satisfy all your game playing needs (and for less than you think!). The normal price for each game is £7.95, but if you buy one now you pay only £6.95 and if you buy three you pay only for two (£15.90).

This offer cannot be repeated and is available only while stocks last. So hurry, give yourself and your BBC a treat!

SOFTWARE PROJECTS

Software Projects Limited, Bearbrand Complex, Allerton Road,
Woolton, Liverpool L25 7SF. Telephone: 051-428 9393 (4 lines).

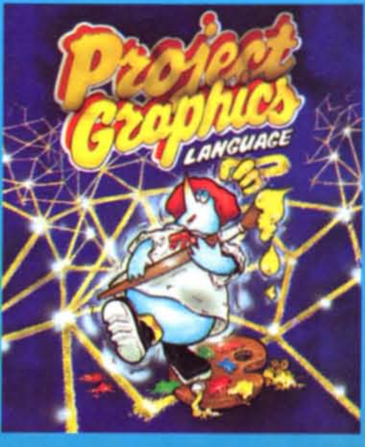
Please send me

I enclose cheque/PO for ....
(Please add £1.00 for orders outside UK)

Access Card No. ....
Name ....
Address......................................
....

For Mail Order only:
Software Projects, P.O. Box 12, L25 7AF

Project Graphics is a logo-type language for 32K BBC and Electron computers. It had been written to allow anybody, even newcomers to computing, to write logo or turtle graphics after a very short period of experimentation with the program. A large and comprehensive manual is provided with it, as are many various demonstrations of the capability of Project Graphics. As well as being very educational, this program is very entertaining and will provide endless hours of enjoyment. Project Graphics costs £9.95.



Special birthday offers from

THE MICRO USER

Save up to 66% on these specially selected packages!

To welcome all the new owners of the BBC Micro, many of whom will be reading The Micro User for the first time, we have some special birthday offers – back numbers of the magazine, tapes and discs to help you catch up on all the good things you have missed!

The complete works to date, with additional free gifts:

Vol. I (March 1983 to February 1984), PLUS binder and Classic Arcade Games tape	£17.50	______
Vol. II (March 1984 to February 1985), PLUS binder and Classic Arcade Games tape	£18.50	______
Vols. I and II, PLUS 2 binders, Classic Arcade Games tape and Dustcover	£35.00	______

All the listings from Vol. I:

12 tapes	£19.99	______
12 5¼" 40 track discs	£29.99	______
12 5¼" 80 track discs	£29.99	______
12 3" discs	£49.99	______

All the listings from Vol. II:

12 tapes	£19.99	______
12 5¼" 40 track discs	£29.99	______
12 5¼" 80 track discs	£29.99	______
12 3" discs	£49.99	______

Volumes I and II listings:

24 tapes	£34.99	______
24 5¼" 40 track discs	£54.99	______
24 5¼" 80 track discs	£54.99	______
24 3" discs	£94.99	______

EXTRA! If you buy any of the above you can order the Magic Sword Pack at the unrepeatable price of only:

tape	£4.99	______
5¼" 40 track	£5.99	______
5¼" 80 track	£5.99	______
3" disc	£7.49	______
	TOTAL	______

NAME ______

ADDRESS ______

☐ I enclose my cheque or postal order made payable to Database Publications Ltd.
☐ Debit my Access/Visa card.

No ______

Signed ______

Send to: The Micro User Birthday Offer, Europa House,
68 Chester Road, Hazel Grove, Stockport SK7 5NY.

As The Micro User enters its third year of publication we invite all our readers to

HELP CELEBRATE OUR BIRTHDAY!

THIS issue of *The Micro User* marks our second birthday. And to celebrate the occasion we've come up with a rather special competition. The winner will receive a gold plated BBC Micro – complete with built-in disc drives and separate keyboard!

The specifications of the micro itself make it the most generous piece of hardware we've ever given. And the fact that it's gold plated means it's totally unique. This is the ultimate BBC Micro – the one for the computer freak who has everything.

So what do you have to do to win the micro with the Midas touch?

Well, our birthday's found us in nostalgic mood, and looking back over these two exciting and eventful years we've been amazed at the changes. From its shaky beginnings with OS 0.1, the BBC Micro has grown to be the

About the Golden Micro...

A LEADING UK insurance company has valued the gold BBC Micro being offered to the winner of *The Micro User's* Second Birthday contest at £5,000.

"But as far as we are concerned it is priceless due to the fact that it is unique", says managing editor Derek Meakin. "And what more fitting way could there be to mark the spectacular success of the magazine itself?"

Within its gold plated, streamlined processor and keyboard casings can be found the BBC keyboard and motherboard, a disc interface, two Imbyte disc drives and an 85 watt power supply unit.

The gold micro – the most fabulous prize ever to be given away by a computer magazine – has been commissioned from the Universal Communications Company, based in Bradford, West Yorkshire.

Now the undisputed leader in the field of customised casings for the BBC Micro, UCC markets its products under the Oak label. These range from the basic processor and detachable keyboard case package at £110 up to the model that has everything at £1,495.

"This is certainly the most unusual – and expensive – job we've ever tackled to date", said David Atkins, head of UCC, "for the base units had to be hand made to ensure a perfect finish in order that the gold dipping process would be totally successful".

In all, the birthday micro has taken UCC a month to make, with more than 20 separate processes being involved in the gold plating operation alone.

"Our only problem now is how we are going to top this when it comes time for our third birthday celebration", says Derek Meakin.

The gold micro will be officially presented to the lucky winner during the Electron & BBC Micro User Show to be held in London in May.

. . . and WIN the fabulous Gold BBC Micro

premier computer for the serious enthusiast. And *The Micro User* has grown alongside it, to become the premier magazine for BBC Micro users.

The world of the BBC Micro has changed incredibly in this short time – users have grown in sophistication, the software has flourished and there's been a boom in peripherals of every sort.

The Micro User itself has changed to reflect this. Compare the contents pages of our first issue and those of our first and second birthday and you'll be amazed.

From those pre-Wordwise days of OS 0.1, Model As and no discs, the world of the BBC Micro now includes second processors, hard discs, a wealth of sophisticated ROM-based software and a host of other innovations.

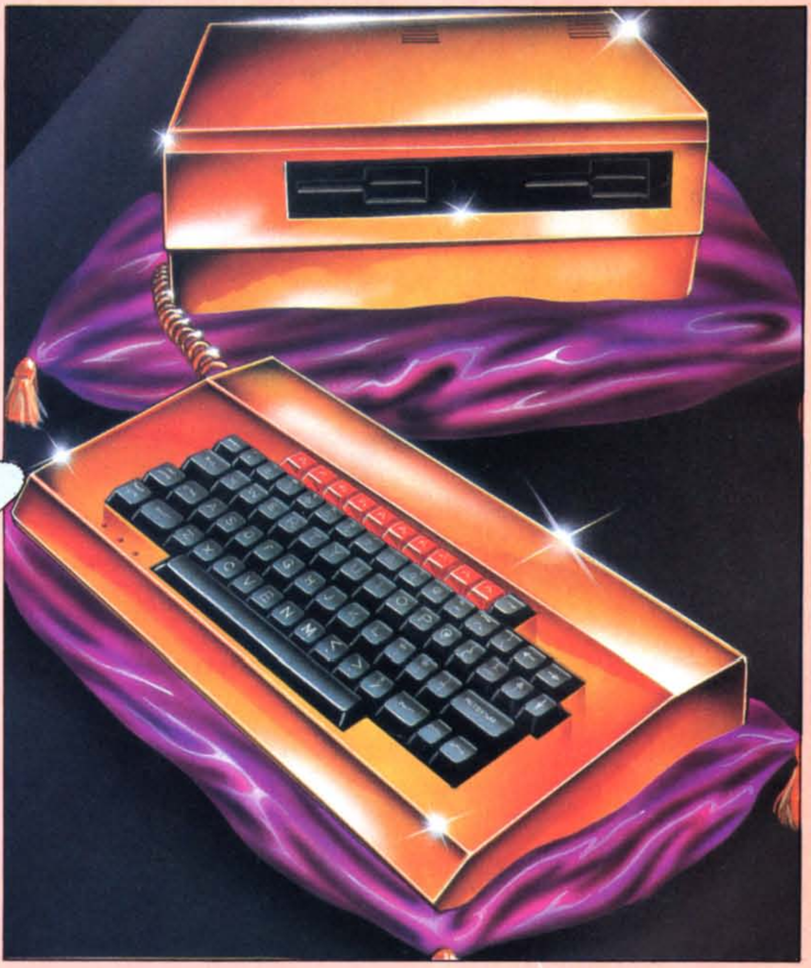
What will the future hold for this versatile Micro? That's what we want you to tell us – what you imagine our contents page will be highlighting on our fifth birthday!

We'd like you to describe five different articles from our March 1988 issue, in the style of our usual contents page – but not more than 20 words on each article please.

The entry we feel most accurately reflects the potential growth of the BBC Micro – and that of *The Micro User* – will be the winner!

Mouse contest winners

WINNERS of the AMX Mouse contest in the December issue of *The Micro User* were Mr William Buckley, Selset Road, Edgbaston, Birmingham, Mr R. Hulme, Birchmeadow, Broseley, Shropshire, and Mr B. H. Davies, Primley Park Walk, Leeds.



Gold BBC Micro contest entry form

These are the articles I expect to see in The Micro User of March 1988:

Article 1

Article 2

Article 3

Article 4

Article 5

Name______________________________

Address____________________________

____________________ Tel____________

Send your completed entry to: Birthday Contest, *Micro User*,
Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.
All entries must reach us by March 31, 1985.

Any improvement on Britain's No.1 word processing ROM...

WORDWISE was the very first ROM based product to be made available for the BBC computer and over the last couple of years it has become the most popular word processing system for the BBC machine with almost 50,000 chips now sold.

It has consistently received excellent reviews for its ease of use and speed. It takes only minutes for the user to become familiar with a powerful professional word processing system.

WORDWISE PLUS is now available extending the original program in many unique directions. Not only is the program now twice the size but the package includes two completely new manuals—an introductory manual that gently introduces the newcomer to word processing with WORDWISE, and a reference manual listing all the commands.

THE WORDWISE PLUS PACKAGE CONTAINS

1. **16K ROM**
2. **SPIRAL BOUND REFERENCE MANUAL (180 pages)**
3. **INTRODUCTORY MANUAL (56 pages)**
4. **KEYSTRIP**
5. **TYPING TUTOR PROGRAM (On cassette)**
6. **EXAMPLE TEXT (On cassette)**
7. **EXAMPLE PROGRAMS enabling mail merging, index generation, etc.**

WORDWISE PLUS is completely compatible with all older versions and is able to use existing WORDWISE files without modification.

WORDWISE PLUS FEATURES

Over the last couple of years we have received countless suggestions for ways of extending or adding new facilities to WORDWISE. It soon became obvious that we would not be able to implement every single suggestion. Indeed, each person uses a word processor in a different way—each individual has differing requirements—a feature that one person may think essential another may have no need for.

We have overcome this problem in two ways. Firstly we have included the most commonly requested additions and improvements. A number of new editing features and a few more embedded commands have been added.

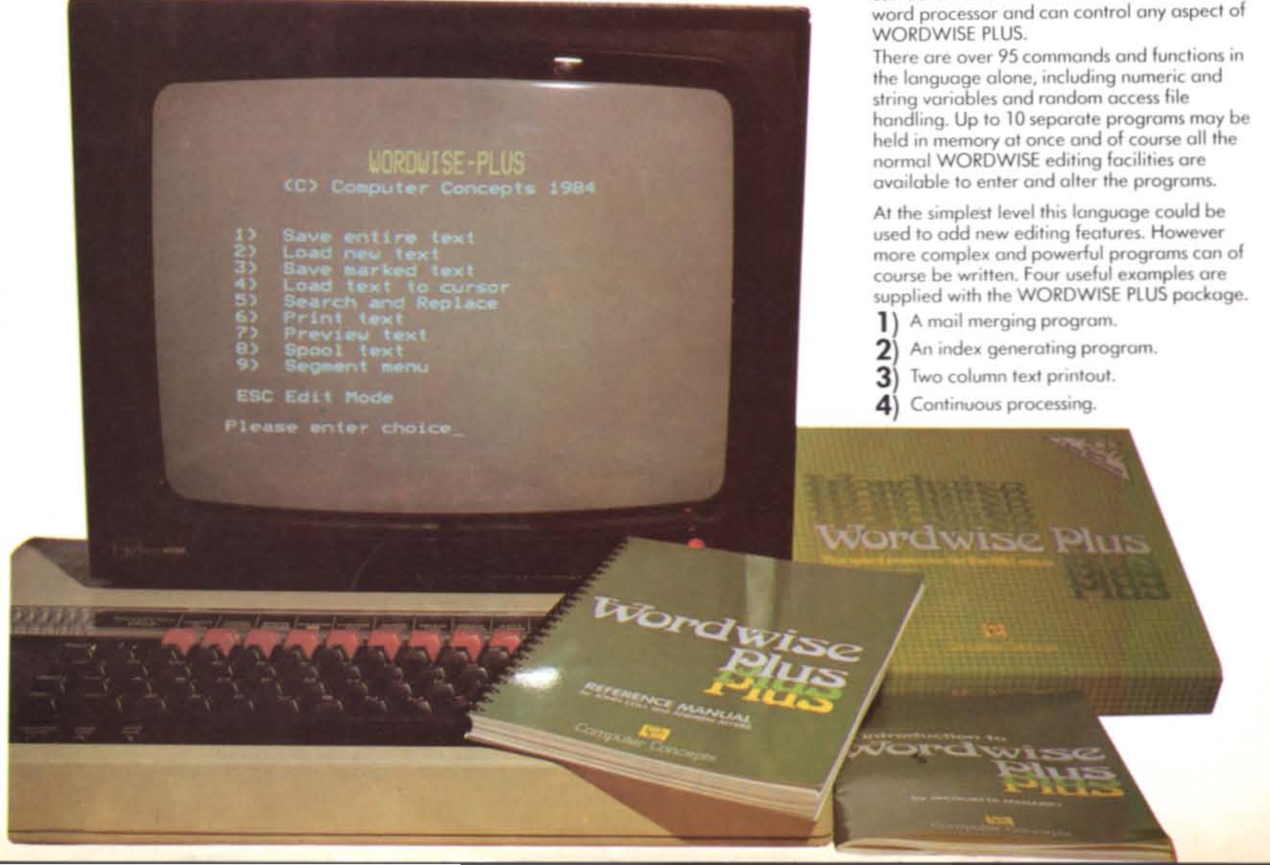
Secondly a unique BASIC-like programming language has been incorporated. This facility enables the capabilities of this word processor to be extended in an infinite number of ways.

The language itself has been designed, like WORDWISE, to be simple to use and understand. Many of the commands look and act like BASIC commands and so will be familiar to many users. However the language can control and use all the functions of the word processor and can control any aspect of WORDWISE PLUS.

There are over 95 commands and functions in the language alone, including numeric and string variables and random access file handling. Up to 10 separate programs may be held in memory at once and of course all the normal WORDWISE editing facilities are available to enter and alter the programs.

At the simplest level this language could be used to add new editing features. However more complex and powerful programs can of course be written. Four useful examples are supplied with the WORDWISE PLUS package.

1) A mail merging program.
2) An index generating program.
3) Two column text printout.
4) Continuous processing.



```
          WORDWISE-PLUS
    (C) Computer Concepts 1984

  1)  Save entire text
  2)  Load new text
  3)  Save marked text
  4)  Load text to cursor
  5)  Search and Replace
  6)  Print text
  7)  Preview text
  8)  Spool text
  9)  Segment menu

  ESC Edit Mode

  Please enter choice_
```

...Must Be A Plus

Word Processing With Wordwise

All the advantages of a ROM—instantly available. One command and your BBC machine becomes a powerful word processing system.

Fast and very simple to use.

The more complex commands are menu driven, enabling those totally unfamiliar with this software to use these more powerful features straightaway.

The function keys are used to full effect with a keystrip clearly showing each function.

Block copies and moves. It is possible to mark any part of your text, this marked section may be instantly moved or copied to any other part of your text. This cut and paste type of operation is a vital part of all word processing operations and with WORDWISE it is simplicity itself.

Automatic headings, footings and page numbering. When printing a document many pages long it is possible to have WORDWISE number the pages for you and put any heading or footing line on each page.

Unique word counting feature. Ideal for journalists, it constantly displays the current number of words typed. It also allows word counting for specific sections of a document.

Works with all filing systems, such as DISC., CASSETTE., and the new ADFS. Works with any printer that works with the BBC machine (most do) and is able to access the special features of any printer (italic, subscripts, etc.). There is no need to buy additional printer driver programs.

Here are a few of the things that have been said about WORDWISE.

"WORDWISE offers an extremely user friendly program . . . it would make an excellent choice for someone rather apprehensive about word processing."

. . . E & CM

"WORDWISE has won a devoted fan club because of its flexibility and ease of use."

. . . Practical Computing

"On the whole WORDWISE is an excellent wordprocessor . . .WORDWISE is thoroughly recommended."

. . . VIEWFAX 258

"WORDWISE is straightforward, friendly and excellent value."

. . . Practical Computing

". . . it is ideal for the home hobbiest and small businessman."

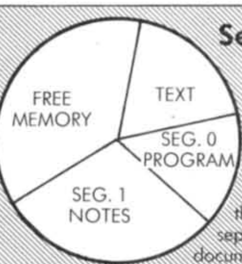
. . . A & B Computing

Word Processing with Wordwise Plus

WORDWISE PLUS still has WORDWISE as its core therefore it is still very user friendly and retains all the features that made WORDWISE the most popular word processor. It now has many new additions making this the most flexible word processor yet.

WORDWISE will continue to be sold alongside WORDWISE PLUS. For those more specialised users who require the added flexibility here are a few of the new features.

Segments



When using WORDWISE PLUS, the BBC's memory is divided between your text and up to 10 segments. Each segment may contain either a program or just normal text. It is therefore possible to store and edit up to 11 separate documents in memory, or 1 document and 10 programs, or any mixture.

Often when writing letter or articles it is useful to keep a notepad, outlining what you intend to write. In WORDWISE PLUS one of the segments could be reserved for an electronic notepad. It would be a simple matter to switch your 'notepad' and your main document with just a single key press.

Some of the New Editing, Embedded Commands and Wordwise Extensions

WORDWISE PLUS works with the 6502 2nd processor. This allows more text to be stored in memory and 80 column previewing no matter how full memory is.

New embedded command FI will fully indent text against the right margin.

New commands for underlining and bold printing. The bold and underline effects are shown on screen—and it is a simple matter to configure these features for any printer.

Saving and loading of text is now up to 10 times faster on disc, and now the computer gives the user a warning if a document is going to be overwritten on the disc or in memory.

There is now a working filename—i.e. WORDWISE remembers the name of the current document being worked on.

New command deletes markers automatically.

It is now possible to print or preview a file directly from disc without having to load it first.

New embedded command 'PS' allows strings to be inserted into the text when it is printed.

New embedded command 'PF' will read a document from file when printing and interpret any embedded command in that file.

Improved search and replace facilities now include wild-cards.

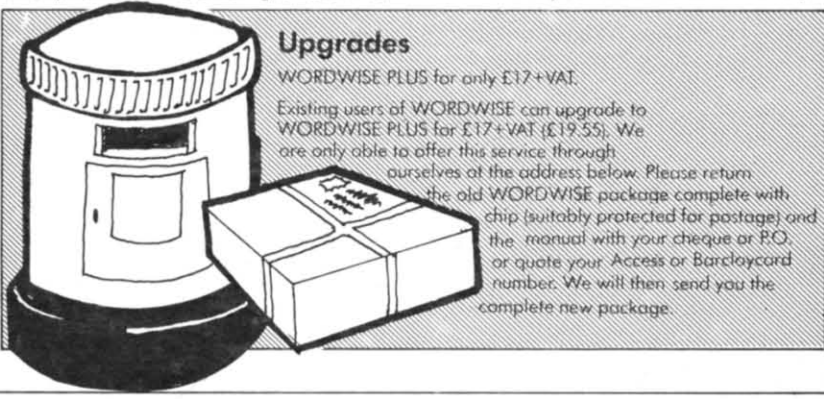
Example Programs Supplied With Wordwise Plus

1) A mail merging program that allows names and addresses to be added to a standard letter. This is a relatively easy job with this language.

2) An index generating program. This finds keywords and generates a separate index listing the word and the page numbers where the keywords occurred.

3) Two column printout. This program will print your text in two columns across the page.

4) Continuous processing. This enables the disc user to process and edit extremely large documents spread over several files as if it were one continuous document in memory.



Upgrades

WORDWISE PLUS for only £17+VAT.

Existing users of WORDWISE can upgrade to WORDWISE PLUS for £17+VAT (£19.55). We are only able to offer this service through ourselves at the address below. Please return the old WORDWISE package complete with chip (suitably protected for postage) and the manual with your cheque or P.O. or quote your Access or Barclaycard number. We will then send you the complete new package.

In The Near Future

HI-WORDWISE for 2nd processors that allows even more user memory, supplied on disc for less than £5 to WORDWISE PLUS owner.

A FAST SPELLING CHECKING PROGRAM.

Both WORDWISE and WORDWISE PLUS are available from all good computer dealers. Alternatively you can obtain these directly from Computer Concepts.

WORDWISE PLUS £49+VAT (£56.35)
WORDWISE £39+VAT (£44.85)

Computer Concepts

Computer Concepts, Gaddesden Place,
Hemel Hempstead, Herts HP2 6EX
Telephone: (0442) 63933

VISA

Electronequip

(Authorised Torch Dealer and Full Unix Advisory Centre)

ACORN DISC UPGRADE

Now in stock **£115.00** inc VAT

Starter Packs:

BBC Starter Pack

ANBOI/ANBSP **£399.00** inc VAT

Disc Starter Pack

ANBS 001 **£499.00** inc VAT
(BBC 'B' + DFS + Microdrive + 3 games)

BUSINESS STARTER PACK

ANBS 002 **£899.00** + VAT

BBC 'B' + DFS + Disc Drive, Monochrome Monitor, Dot Matrix Printer, Word Processing, Spreadsheet and Database

Electron Starter Pack

ALAOI/ALASP **£229.00** inc VAT

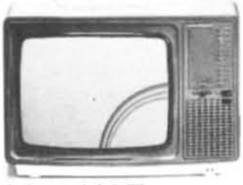
Networking Torchnet/Econet

Advanced connection techniques used on our networks considerably reduce joint resistance ensuring lower end to end resistance than by any other method.

All our BBC's and Torches are networked together. Are yours:

If not phone 0329 230671.

NORDMENDE



14" TV/Monitor
£199.00 + VAT

Remote version **£219.00** + VAT
Offer includes RGB/BBC cable.

Buy this superb TV/Monitor from the original distributors (since Sept '82)

TAXAN/KAGA *
KP810

£299.00 + VAT

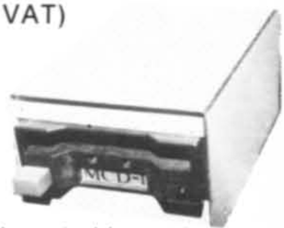
Printer price includes paper and BBC interface cable.
Screen dump rom available for £11.50

TORCH Disc Pack
SPECIAL OFFER

Only **£659.00** + VAT
(Free fitting available if required).

3" Micro Disc £59.95 (inc. VAT)

Disc Interface & Drive
£174.95 inc. VAT)



Micro Disc Drive for the BBC Micro

The Micro disc drive offers a method of low cost quick access to programs. The drive is essentially a small version of a 5¼" disc drive and offers similar features to the larger drive.
The data is stored on a 3" disc, this is enclosed in a protective hard plastic cassette which features a write protect switch.
The micro drive requires the standard Acorn disc interface, but a new disc filing system rom. Acorn DFS may be exchanged for the micro DFS for £2.30. The new micro disc filing system can read and write to Acorn DFS discs.
Thus if a 5¼ inch and a micro floppy were connected on the same cable files could be transferred between them.
Capacity: 80.64 K bytes **Transfer Rate:** 125k bit/s.

BRANCHES
MAIL ORDER: 36-38 WEST STREET
FAREHAM, HANTS. (0329) 230670
SHOP/TECHNICAL: 59 WEST STREET
FAREHAM, HANTS. (0329) 230671
KINGS LYNN: 17 TENNYSON AVE. (0553) 3782

ACORN COMPUTER

Electronequip
59 West Street, Fareham, Hants (0329) 230671

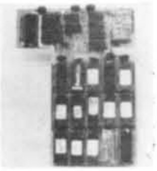
TORCH

Electronequip

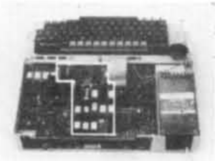
(Authorised BBC Micro Dealer, and Econet service centre)

ALL ITEMS THIS PAGE – MAIL ORDER OFFICE ONLY

SIDEWISE



SIDEWISE FITTED



"SIDEWAYS" rom board for BBC Micro.
No soldering required **£33.44** + **VAT**

BBC SPARES

TTL	
LS00	.40
LS10	.30
LS74	.46
LS123	.75
LS132	1.20
LS163	1.35
LS244	1.47
LS245	2.00
LS393	1.20
7438	.75

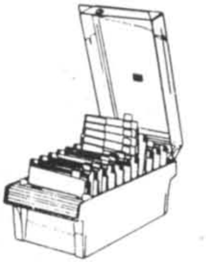
CMOS/ULA's etc.	
3691	4.92
88LS120	4.23
4013	.60
4020	.90
4816	2.90
7002	7.25
6522	5.22
LM324	.70
Video ULA	15.75
Serial ULA	9.45

ROMS	
1.2 MOS Rom	6.00
BASIC II Rom	26.00
DNFS Rom	17.91

Full range of Roms stocked

OTHERS	
Keyboard	52.38
Keyboard swt	2.60
Cass Relay	2.20
BBC Power Supply	52.92

DISKETTES	
Memorex 40T	18.00
Memorex 80T	28.00
Cleaning Kit	8.65



DISC BOXES	
10 disc library case	2.50
30 disc Disc Box	6.00
40/45 disc Disc Box	16.48

UPGRADES	
Acorn DFS	100.00
Econet	60.00
Speech	47.80
Memory 16-32K	20.00
Analogue input	14.00
Printer port	15.00
Serial	13.00

DUST COVERS	
RX80F/T	4.56
FX80	4.60
BBC Micro	3.60

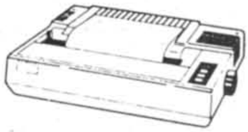
(VAT @ 15% to be added to all above prices)

SOFTWARE SALE

most **ACORNSOFT £2.99** inc VAT
MICROPOWER etc **£199** inc VAT

*EPSON

RX-80FT £219.00 + VAT
FX-80 £316.00 + VAT



Printer Pack **includes** paper & BBC cable **£7.00** + VAT
Screen dump rom available for **£10.00** + VAT

JUKI 6100

£325.00 + VAT
Sheet feeder
£189.00 + VAT

VOLTMACE JOYSTICKS

***10% off list prices**

		Discounted price inc VAT
BJVOLT 14	Voltmace Delta 14B Joysticks	13.46
BJVOLTAD	Voltmace 14B/1 Adaptor Box	13.36
BJVOLT3T	Voltmace Delta 3B Twin Joysticks	17.99
BJVOLT3S	Voltmace Delta 3B Single Joystick	11.95

All offers subject to availability
Prices subject to variation without prior notification
Postage 46p. Securior 4.90 (per parcel)
TRADE, EDUCATIONAL & HMG ORDERS WELCOME
Access & Barclaycard Accepted
Large Stocks – 24 Hour Despatch

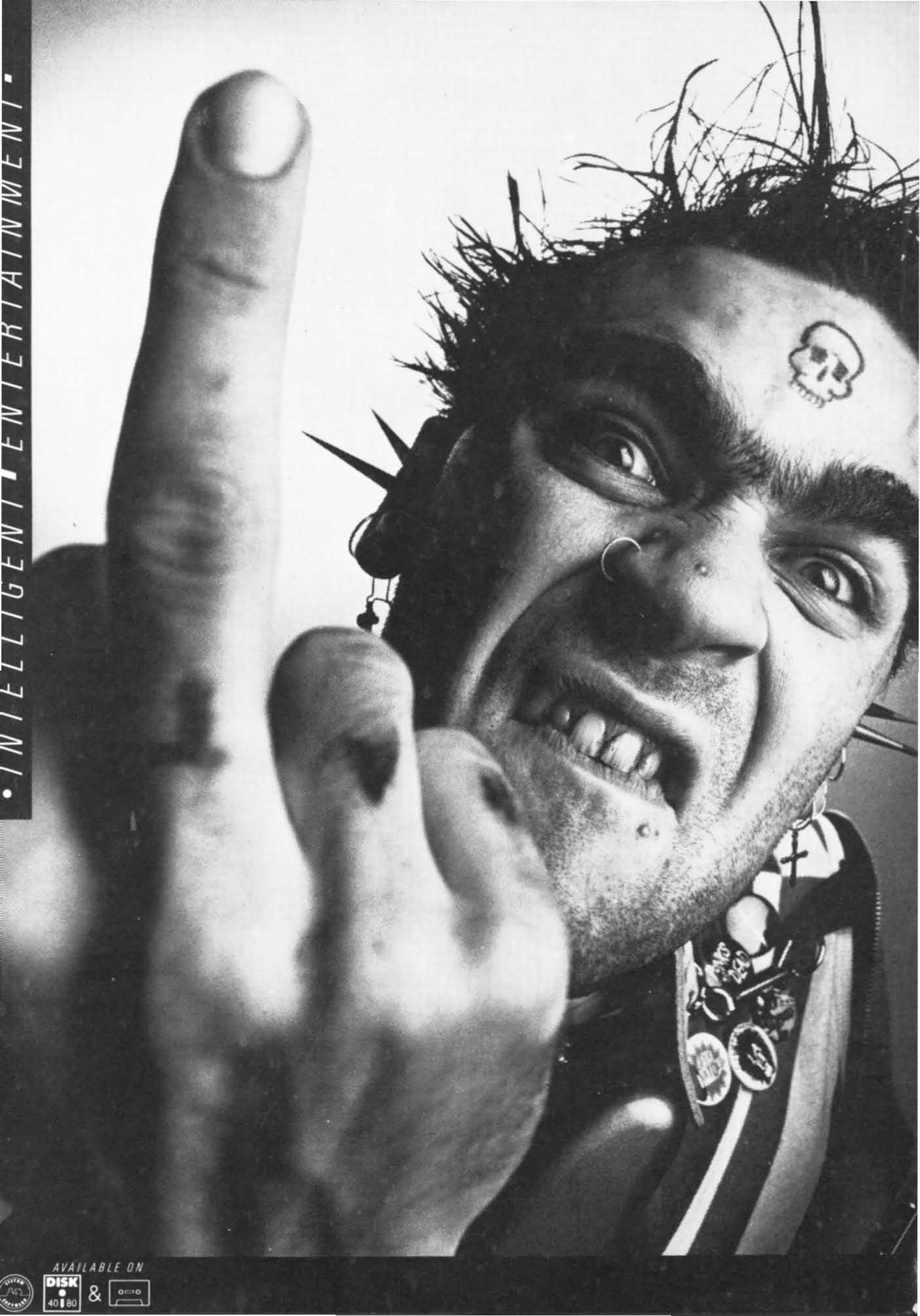
MAIL ORDER ENQUIRIES TO BELOW OFFICE

ACORN COMPUTER

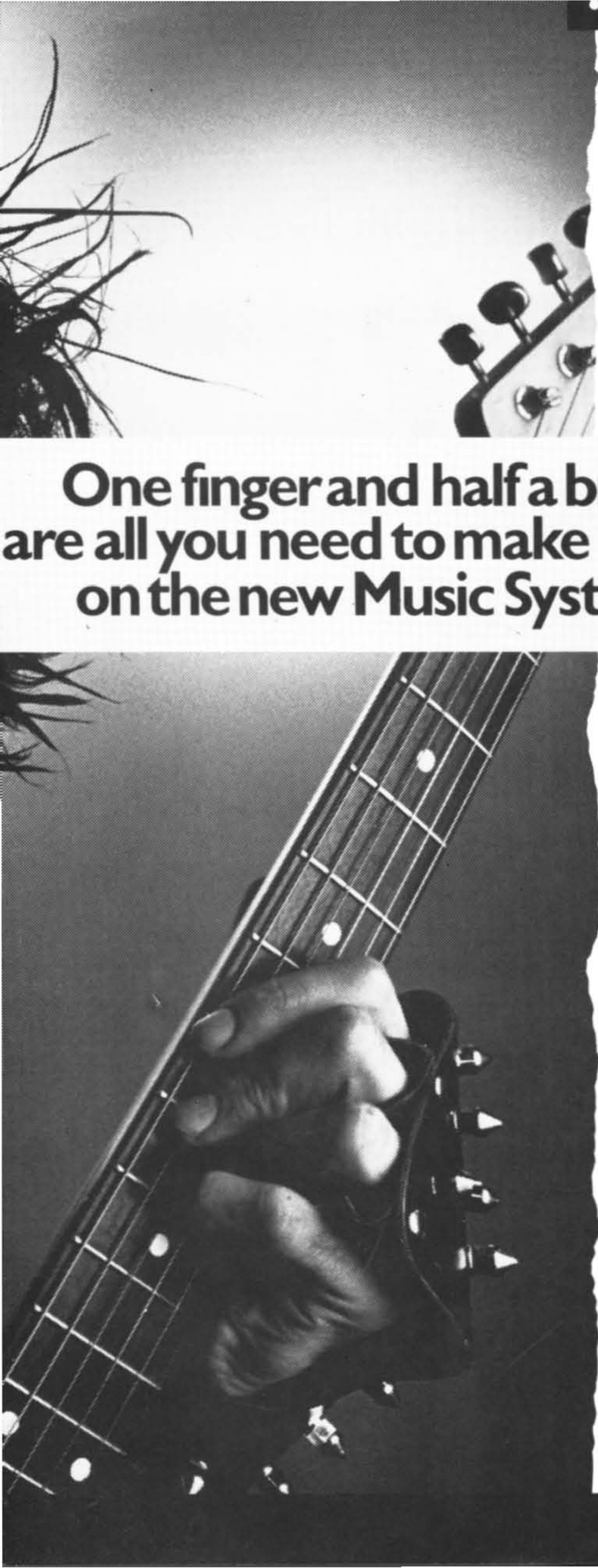
Electronequip

36-38 West Street, Fareham, Hants (0329) 230670

BBC


•INTELLIGENT ENTERTAINMENT•
AVAILABLE ON
DISK 40 80
&
SYSTEM 3 SOFTWARE

• ISLAND • LOGIC •



One finger and half a brain are all you need to make music on the new Music System.

You're looking at a composer.

It's hard to believe, I know. But with the aid of The Music System program, he has just written a whole 'song' completely by himself.

Clever boy.

"Toxteth Dawn" is the name of the 'song'.

It's a love song.

Without any knowledge of music he bought the music system program, went home, booted it up on his dad's BBC B and started to create.

He used the synthesiser part of the program to make a few noises. Added a pinch of an old song from the Song and Sound Library.

Laid down some percussion. And put a hint of bassoon and strings over the top.

And hey presto.

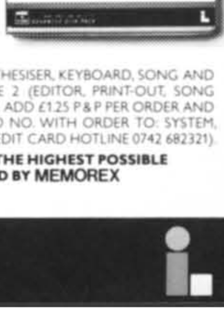
The musical answer to zits. "Toxteth Dawn."

Because his dad's computer had a printer as well, the program even printed out the composition in full musical-manuscript form.

So he could show it to the rest of the band. And they could say. 'WOSSAT?'

Isn't it time you became a composer too?

The brand new Music System from Island Logic.



DISK PACK £24.95 INC VAT. CASSETTE 1 (SYNTHESISER, KEYBOARD, SONG AND SOUND LIBRARY) £12.95 INC VAT. CASSETTE 2 (EDITOR, PRINT-OUT, SONG AND SOUND LIBRARY) £12.95 INC VAT. PLEASE ADD £1.25 P&P PER ORDER AND SEND A CHEQUE/PO, ACCESS OR VISA CARD NO. WITH ORDER TO: SYSTEM, 12 COLLEGIATE CRES., SHEFFIELD S10 2BA. (CREDIT CARD HOTLINE 0742 682321).

THIS PROGRAM IS RECORDED ON THE HIGHEST POSSIBLE QUALITY DISKS, AS SUPPLIED BY MEMOREX

Defeat the alien QLcraft to mine vital Acornium in GRAHAM WALKDEN's . . .

ASTRO MINES

CAUTIOUSLY you pilot the starship Galaxy Hopper towards the cratered planet Ocrim Seru – the last orbital in Galaxy One.

The ship heaves gently as it responds to the massive proton propulsion motors pushing you into orbit. At the optimum height for mining the ship's systems are initialised for the task.

With a fulminating roar the planet is reduced to ionised particles and the descriminators isolate the vital element Acornium and precipitate it in the cargo hold, ready refined.

The cloud of rejected Acornium-depleted matter glows in the weak sunlight as you once again engage the engines, propelling the spacecraft towards the minefield.

Suddenly the indicator on your console flashes a warning – dead ahead is an anti-matter mine. Reacting instantly, you manouevre the craft so as to avoid the hazard.

Just as you think it is safe, you hear a sound that sends shivers down your spine, the interference whine of an alien QLcraft.

Swiftly, you rotate your weaponry to face the invader, your fingers flip over the control panel and you fire a deadly second processor torpedo.

This goes wide, avoiding the enemy craft and you desperately wait for the energy to regenerate so that you can launch another. Meanwhile, you are helpless . . .

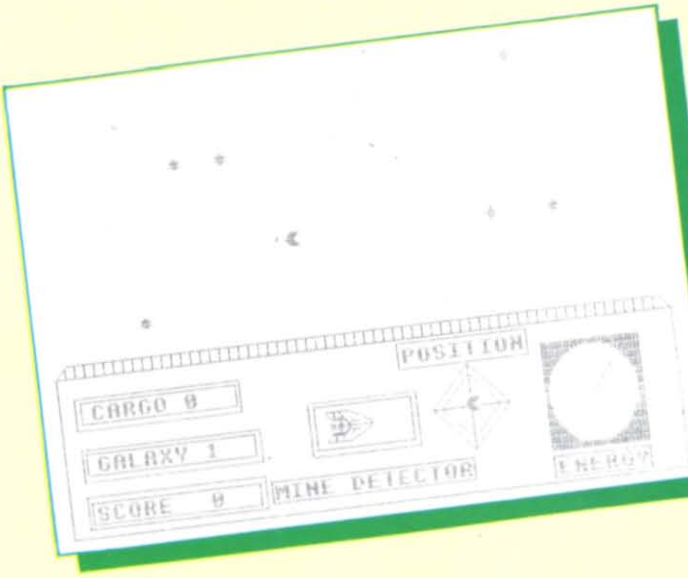
The alien draws nearer, intent on destroying your ship. As the image grows on your scanner you realise that this is the end. But just in time to save your craft the energy returns and you fire another torpedo.

This time your aim is true and the topedo homes in on its target and detonates.

The target computer confirms that the alien menace has indeed been destroyed, and you wipe the perspiration from your brow as you are teleported into Galaxy Two to invade and destroy its occupants.

This is the scenario for Astro Mines.

Type the game in as it appears in the listing, then type RUN (Return). Disc users need not worry – it works perfectly with PAGE set at &1900.


CARGO 0
GALAXY 1
SCORE 0

All being well, you will be greeted by a Mode 7 display – Mode 6 if you are using an Electron – displaying the highest and previous scores, and instructing you to engage the Caps Lock.

You will be asked to select options, P to play or I for instructions. Press P and you will be asked to wait as the screen display is drawn. Once done, your ship will be printed in the middle.

There are three movement keys to alter its position. The Z and X keys are used to rotate the ship left and right respectively, and are required to position the craft so as to move onto the next space.

Try these keys, and your ship should rotate quite quickly. Keep an eye on the mine detector in the centre of your display panel, and if a circle appears in front of the plan view spacecraft depicted it means that you are in front of a mine.

Any attempt to move onto this will result in the starship exploding and the game will end.

There is little point in staying in the centre of the screen all the time, so the space bar has been set up to fire the engines.

Pressing it will move the ship in the direction shown by the position indicator. The ship will come to a halt and it will now be ready for the next movement.

Use the three movement keys to position your craft over the planets which appear as asterisks on your display. when you land, the planet will be mined, and the screen will flash as it is destroyed.

Your cargo counter will increase, and so will your score. When you have mined all the planets you will be transported into the next galaxy, which will have one more planet than the last.

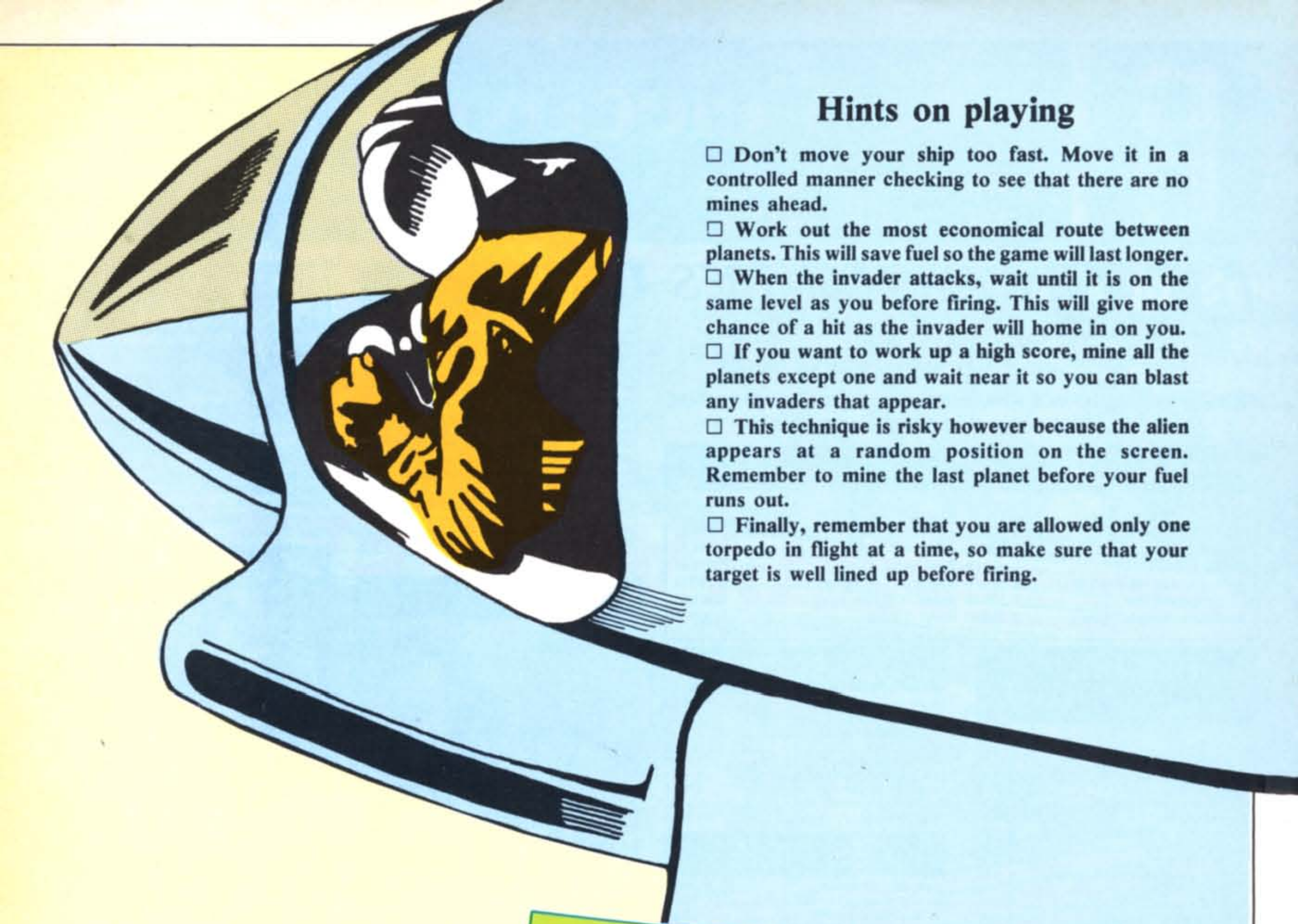
The more planets there are, the longer you will take to clear them. You have to watch the fuel gauge on the control panel so that you don't run out of energy. If you do, your force fields will disappear and your ship will explode.

From time to time you will hear a whining sound and an alien spacecraft will appear on the screen. It will home in on you and destroy your craft. The only way to stop it is to fire your torpedoes, which is done by pressing Return.

The alien will be destroyed in one of two circumstances: if you hit it with a missile or if it crashes into a planet.

For each alien you destroy, your score increases.

Full listing starts on Page 161



Hints on playing

☐ Don't move your ship too fast. Move it in a controlled manner checking to see that there are no mines ahead.

☐ Work out the most economical route between planets. This will save fuel so the game will last longer.

☐ When the invader attacks, wait until it is on the same level as you before firing. This will give more chance of a hit as the invader will home in on you.

☐ If you want to work up a high score, mine all the planets except one and wait near it so you can blast any invaders that appear.

☐ This technique is risky however because the alien appears at a random position on the screen. Remember to mine the last planet before your fuel runs out.

☐ Finally, remember that you are allowed only one torpedo in flight at a time, so make sure that your target is well lined up before firing.

PROGRAMMING CONCEPTS

ASTRO Mines has several routines and programming techniques you may find useful.

The program senses what is on the screen and when by using a two dimensional numeric array. This is a variable that has many different values defined by the numbers after it.

The variable used is B(39,29), so if a planet is present at position (10,10) on the screen, B(10,10) will have the value of two – this being the code for a planet. The code for a mine is 1.

A$(8) is used for the spaceship. This array holds eight different spacecraft of the same design but in eight different rotation positions.

Pressing the Z or X keys alter the value of the variable *R%* and the program will print out A$(R%), giving the illusion of rotation.

This is fast and effective. The only pause in rotation is when a mine appears close by and is printed in the mine detector.

This is done by combining the text and graphics cursors and printing the character, and so takes longer than normal text-only printing.

Arrays are again used to work out in which direction to move. Two variables are associated with moving the image on the screen.

Each component can be one of three values, –1,0 or 1. For example, if the vertical component is 0 and the horizontal one –1, the ship will move one space to the left.

The variables used are *Q%(8)* and *W%(8)*. The values are assigned by READing them from a list of data. At any time, the direction in which the image will move can be determined by inspecting Q%(R%) and W%(R%).

The values are all worked out so as to act in the right circumstances – that is so as not to move the ship backwards when it should move forwards.

The black solid circle for the fuel gauge is constructed by drawing PLOT 85 triangles in a sin/cos loop, thus producing a circle. (Lines 1100 and 1110).

p&h electronics Ltd

5 THE PARADE · YATELEY
TEL: YATELEY 877222

22/24 GUILDFORD ROAD · BAGSHOT
TEL: BAGSHOT 73078

BBC MICRO CENTRES

TELEPHONE OR VISIT

ALL PRICES INCLUDE VAT
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

FAST PHONE/MAIL SERVICE – SAME DAY DESPATCH ON ITEMS IN STOCK
SUPPLIERS TO MANY EDUCATION AUTHORITIES

COMPUTERS

Electron + 5 Programs	£ 190.00
Electron 'Me and My Micro Pack'	£ 220.00
BBC B Starter Pack	£ 399.00
BBC B + DFS	£ 469.00
Sinclair Spectrum 48K + 6 Programs	£ 129.00
Sinclair Spectrum Plus	£ 129.00
Sinclair QL + Business Software	£ 389.00
Amstrad CPC464 Mono + 12 Programs	£ 349.00
Amstrad CPC464 Colour + 12 Programs	£ 239.00
Toshiba MSX System + 3 Programs	£ 199.00
Sanyo MSX	£ 275.00
Sony Hit Bit + 3 Programs	£ 290.00
Apricot Fle System	£1025.00
Apricot FI System	£1255.00

COMPUTER BOOKS–

BBC User Guide Binder	£ 3.95
Advanced User Guide BBC	£12.95
Advanced user Guide Binder	£ 3.95
Advanced Basic Rom BBC	£ 7.95
Advanced Graphics for BBC	£ 9.95
Advanced Machine Code on BBC	£ 7.95
Advanced Prog Techniques BBC	£ 8.95
Alp on the BBC Micro	£ 7.95
Basic Prog BB Micro	£ 6.95
Basic Rom User Guide (BBC Electron)	£ 9.95
BBC Basic for Beginners	£ 7.95
BBC Disc Companion	£ 7.95
BBC Micro Assembly Language	£ 7.95
BBC Micro Sound/Graphics	£ 7.95
Business Applications BBC	£ 7.95
Disc Prog Techniques BBC	£ 7.95
Exploring Music (BBC Electron)	£ 9.95
30 Hour Basic for BBC	£ 6.95
Advanced Graphics Electron	£ 6.95
Advanced Prog Techniques	£ 8.95
ALP Electron	£ 7.95
Easy Prog Electron	£ 5.95
6502 Applications	£13.50
6502 Ass Language Prog	£17.50
6502 Sub-Routines	£17.50
Z80 Assy Language Prog	£17.50
Z80 Applications Book	£13.50
CPM Handbook	£12.50
CPM/PLUS Handbook	£12.95
Wordstar and CPM 'Made Easy'	£ 6.95
Wordstar 'Made Easy'	£13.95
The Complete Forth	£ 6.95
Logo Programming	£ 8.95
Program Micro with Pascal	£ 8.50

ACORNSOFT BOOKS–

Creative Graphics	£ 7.50
Graphs and Charts	£ 7.50
Lisp Manual	£ 7.50
Forth Manual	£ 7.50
5-Pascal Manual	£ 7.50
BCPL Manual	£15.00
Creative Assembler	£ 7.50

ACORNSOFT-VIEW

View Rom (Inc Manuals)	£58.00
View Sheet Rom	£58.00
View Guide Book	£ 2.50
Into View Book	£ 2.50
View Sheet Manual	£10.00
Printer Driver Generator Cassette	£ 9.95
Printer Driver Generator Disk	£11.50
Hi-View (for 2nd 6502)	£58.00
View Index Disk	£14.95

ACCESSORIES

Quality Digital Recorder	£ 29.95
Quickshot II Joystick for BBC	£ 19.95
Full Proportional Joysticks Pair	£ 20.00
Soft Dust Cover 'B' and Electron	£ 5.00
Hard (Fibre Glass) Dust Cover	£ 10.00
Printer Cover (State Type)	£ 5.00
Light Pen with Software	£ 45.00
Monitor Plinth Strong Metal	£ 18.50
Single Computer Desk Metal Frame	£ 59.95
Double Computer Desk Metal Frame	£ 69.95
Mains Distribution Block with Plugs	£ 7.50
Sideways Rom Board	£ 45.00
Disk Storage Box (50)	£ 18.00
Disk Storage Box (85)	£ 23.00
Data Modem	£199.00
Data Modem Auto Dial	£299.00
TV Aerial/Computer Switch	£ 2.50
BB Key Function Key Mask	£ 1.50
Flow Chart Template	£ 1.50
BBC Giant Reference Card	£ 2.50
Printer Lead Par	£ 12.95
Printer Lead Serial	£ 9.95
Cassette Lead	£ 3.95

MONITORS

Ferguson MM02 High Res Mono Green 12''	£ 85.00
Ferguson MM01 High Res Mono Amber 12''	£ 85.00
Sanyo DM8112 High Res Mono Green 12''	£115.00
Microvitec 1431 Std Res Colour 14''	£215.00
Microvitec 1451 Med Res Colour 14''	£290.00
Microvitec 1441 High Res Colour 14''	£485.00
Microvitec 1451 Q3/QL Black Med Res 14''	£280.00
Sanyo 3125 Std Res Colour 14''	£215.00
Ferguson MC01 14'' CTV + RGB Monitor	£215.00
Saba 37541 14'' CTV + RGB Monitor	£215.00
Hitachi 1444 14'' CTV + RGB Monitor	£199.00
Hitachi 1446 As above remote control	£230.00

PRINTERS

Epson RX80T	£240.00
Epson RX80FT Plus	£270.00
Letter Quality Board (RX80FT +)	POA
Epson FX80	£400.00
Epson P40	£090.00
Epson 2K Serial Interface	£ 25.00
Cannon PW1080A	£340.00
Tally MT80 Plus	£215.00
Tally MT80 + LQ Board	POA
Letter Quality Board (MT80 +)	POA
Silver Reed EX500 D/wheel	£320.00
Silver Reed EX43 D/wheel with Keyboard and Interface	£399.00
Juki 2200 D/wheel	£299.00
Juki 6100 D/wheel	£385.00
2000 Sheets Fanfold Paper	£ 14.00

ROMS/UTILITIES

Wordwise	Rom	£40.00
Wordwise Plus	Rom	£50.00
Disk Doctor	Rom	£29.00
Printmaster	Rom	£29.00
Graphics	Rom	£29.00
Caretaker	Rom	£29.00
Termi	Rom	£29.00
Communicator	Rom	£65.00
Toolkit	Rom	£27.00
Exmon	Rom	£27.00
Murom (Misic)	Rom	£28.00
Masterfile II	Disk	£19.00
Help	Rom	£24.00
Sleuth	Rom	£28.00
Spellcheck (View)	Rom	£30.00
Spellcheck (View)	Disks	£19.00
Spellcheck (W-wise)	Rom	£30.00
Spellcheck (W-wise)	Disks	£19.00
Hershey Characters	Disk	£15.00
Hershey Characters	Cassette	£10.00
Ade	Rom	£55.00
Logo (LCSI)	Rom	£60.00
BBC Ultracalc	Rom	£75.00
BBC Beyond Basic	Cassette	£11.50
BBC Typing Tutor	Cassette	£15.00
BBC Record Keeper	Cassette	£13.50
BBC Home Finance	Cassette	£ 9.95
Clares Replica II	Disk	£12.00
Clares B Base	Disk	£23.00
Gemini Database 24K	Rom	£129.00
Starbase	Rom	£69.00

DISK DRIVES

CSX100 100K S/S no p.s.	£116.00
CSX200D 200K D/S no p.s.	£162.00
CSX200 200K S/S no p.s.	£155.00
CSX400 400K D/D no p.s.	£185.00
CS100 100K S/S with p.s.	£155.00
CS200D 200K D/S with p.s.	£200.00
CS200 200K S/S with p.s.	£190.00
CS400 400K D/S with p.s.	£215.00
CD200 Dual 100K S/S	£280.00
CD400D Dual 200K D/S	£280.00
CD400D Dual 200K D/S	£375.00
CD400S Dual 200K S/S	£350.00
CD800S Dual 400K D/S	£399.00
All above 80 track switch to 40 track.	
CSX351 3.5'' 100K S/S	£134.00
SSX354 3.5'' 400K D/S	£193.00
CDX352 3.5'' Dual 100K S/S	£245.00
CDX358 3.5'' Dual 400K D/S	£366.00
10 x DS DD 96TPI Disks (in case)	£20.00

ACORNSOFT PERIPHERALS

Z80 2nd Processor	£399.00
6502 2nd Processor	£199.00
IEEE Interface	£325.00
Bit Stick	£375.00
Teletext Receiver	£225.00
Prestel Receiver	£139.00
Music synthesiser	£199.00
Disk Interface Kit	£105.00
Speech Kit	£ 55.00
Cassette Recorder	£ 35.00
Econet Components	POA
Electron Plus One	£ 59.95
Electron Plus Three	£229.00
A to B Upgrade Kit	£ 75.00

ACORNSOFT

EDUCATION

Algerbraic Manipulation	£ 9.95
Peeko Computer	£ 9.95
Business Games	£ 9.95
Word Hunt	£11.90
Word Sequencing	£11.90
Chemical Analysis	£13.80
Chemical Simulations	£13.80
Jars	£11.90
Temperature Control	£ 9.95
The Examiner	£ 9.95

LANGUAGES

Forth Cassette	£14.65
Forth Disk	£16.85
Lisp Cassette	£14.65
Lisp Disk	£16.85
Microtext Cassette	£49.85
Microtext Disk	£59.85
Logo Rom	£69.00
BCPL Rom Disk Manual	£95.00
Turtle Graphics Cassette	£ 14.65
5-Pascal Cassette	£ 16.85
5-Pascal Disk	£ 19.95
ISO-Pascal Rom	£ 69.00
Graphics etc –	£ 9.95
Creative Graphics	£ 9.95
Graphs and Charts	£ 9.95
Picture Maker	£ 9.95
Shirley Conrans Garden	£ 9.95
Personal Money Management	£ 11.95
Collector Catalogue	£ 9.95
Membership Manager	£ 9.95
Desk Diary	£ 9.95
Forecast	£ 11.95
French (also Electron)	£ 14.95
Italian (also Electron)	£ 14.95
Spanish (also Electron)	£ 14.95
German (also Electron)	£ 14.95
Database Disk	£ 15.45

FULL RANGE OF ACORNSOFT GAMES

TOP GAMES

Elite Cassette	£14.95
Elite Disk	£17.65
Elite Cassette Electron	£12.95
Aviator Cassette	£14.95
Aviator Disk	£17.65
Snooker Cassette	£ 9.95
Snooker Disk	£11.50
3D Grand Prix	£ 9.95
Ghost Busters	£ 9.95
Frak	£ 8.95
Scrabble	£15.95

SOFTWARE BY:
MICROPOWER · SUPERIOR · GEMINI
INVASION · VISIONS · BUG BYTE ETC.

MAIL ORDER COUPON

P&H ELECTRONICS LIMITED
22/24 GUILDFORD ROAD · BAGSHOT · SURREY GU19 5JN

Please send me:

1 ______ 4 ______
2 ______ 5 ______
3 ______ 6 ______

I enclose cheque/PO for ______ P&P see above ______

Or please debit my Access/Barclaycard/Visa* *(delete as applicable)*

Card Number ______ Expiry Date ______

IF NECESSARY YOU CAN ORDER BY LETTER

BARCLAYCARD VISA

CARRIAGE COSTS—Micro's, Monitors, Disk Drives, Printers £7
Books, Cassettes, Decks, Leads, Software 50p each item.
ACCESS/BARCLAYCARD/VISA ORDERS WELCOME
CREDIT FACILITIES Instant credit up to £1,000, deposit 10%

Access

PLEASE STATE; IF FOR 'ELECTRON', DISK FORMAT 40 OR 80 TRACK

Name ______

Address ______

Telephone ______

CARE ELECTRONICS

UNIT 14, PEERGLOW INDUSTRIAL ESTATE, OLD'S APPROACH, TOLPITS LANE, WATFORD, HERTS.
☎ TELEPHONE: 0923 777155 ☎

Dual Power Supply Units for Disc Drives

- ★ Colour finished to match BBC Micro.
- ★ Comes complete with moulded mains lead
- ★ 6 pin BBC outlet or Dual power leads for disc drives. (Please specify when ordering).

POWER RATING

- ★ **Standard version:** Suitable for use with TEAC and TEC drives.
- ★ High rated version: Suitable for use with MITSUBISHI, TANDY, CANON, etc. (Please ring factory for other makes).

Price each:

Standard @ 35.65b Inc VAT
High Rated @ 37.95b Inc VAT

MAKE YOUR TEAC AND TEC DRIVES SWITCHABLE (40/80 conversion assembly)

200K and 400K Drives only

Teac version @ 5.75c/Tec version @ 7.36c

★★★ DUE TO POPULAR DEMAND ★★★

The new updated 6 way computer/printer selector.

- ★ 26 pin as BBC.
- ★ 1 micro to 6 printers.
- ★ 6 micros to 1 printer.
- ★ Colour finished to match BBC.

@ 69.00d Inc VAT

READYMADE LEADS:

RIBBON:	
Disc drive single	@ 6.67c Inc VAT
Disc drive dual	@ 10.12c Inc VAT
Printer	@ 7.82c Inc VAT
Parallel 26 pin	@ 8.74c Inc VAT
Serial 25 pin "D"	@ 12.88c Inc VAT
OTHERS:	
RGB 6 pin DIN	@ 2.99c Inc VAT
RGB 6 pin to 7 pin DIN	@ 4.14c Inc VAT
RGB 6 pin to SKART	@ 7.82c Inc VAT
BBC to single disc	@ 3.45c Inc VAT
BBC to Dual disc	@ 4.60c Inc VAT
Serial 25 pin "D"	@ 12.88c Inc VAT

We can make up any combination of cable assy. Please contact our Factory for details.

FLOPPY DISCS: (Boxed in 10's)

3M's Single sided Double Density	@ 16.10c
3M's Double sided Double Density	@ 25.99c
Fuji Double sided Double Density	@ 25.99c

★ ★ Special Offer ★ ★

10× CARE D/sided D/density FUJI @ 24.15c
Packed in plastic presentation storage box.

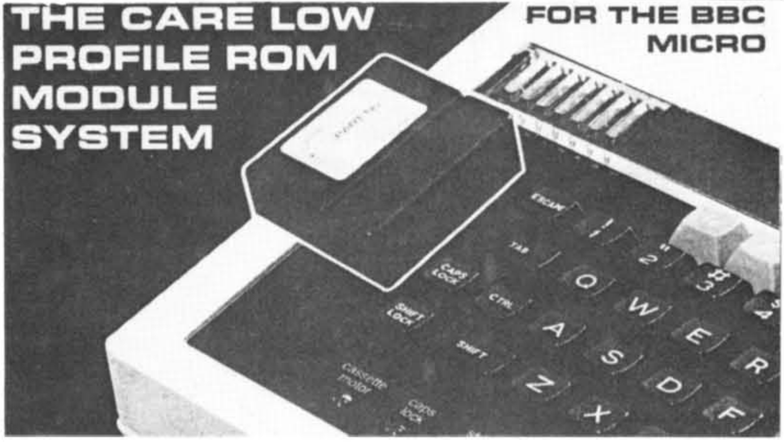
★ ★ Special Twin Pack ★ ★

2× Fuji D/S D/D in Wallet @ 5.75c

CARE ELECTRONICS
TEL: 0923 777155

THE CARE LOW PROFILE ROM MODULE SYSTEM

FOR THE BBC MICRO



Don't run the risk of damaging your ROMS/EPROMS or your BBC Micro. Whenever you want to remove ROMS/EPROMS from your BBC, why not fit our Low Profile ROM Module System and save your collection of ROMS/EPROMS in our specially designed cartridges. The CARE LOW PROFILE MODULE SYSTEM does not take any power from your BBC Micro and allows you unlimited ROMS/EPROMS.

The CARE LOW PROFILE ROM MODULE SYSTEM gives you the flexibility to plug in any ROM/EPROM, for example – Disc Doctor – Toolkit – Wordwise etc – without having to re-open your BBC Micro every time you want to change your ROM/EPROM.

The CARE LOW PROFILE ROM MODULE SYSTEM is a ribbon extension cable through the predestined slot on the left of the BBC keyboard, fitting into one of the existing sideways ROM sockets. Once you have fitted the module system, you need one CARE ROM CARTRIDGE for every ROM/EPROM.

The CARE LOW PROFILE ROM MODULE SYSTEM has been designed to fit all BBC Micros Model B. It will also fit BBC Micros Model A which have been upgraded to enable access through predestined slot to sideways ROM sockets.

Each CARE LOW PROFILE ROM MODULE SYSTEM comes neatly packaged in a special presentation case.

The CARE Low Profile system is totally compatible with the VIGLEN system

EACH SYSTEM CONTAINS:

- 1 Low profile socket housing.
- 1 Cable assembly.
- 1 Rom cartridge.
- 5 Blank labels.
- 1 Fitting instructions.

COMPLETE SYSTEM	@ £16.10 inc. VAT
Spare Cartridge	@ £4.14 inc. VAT
5 Cartridges	@ £19.55 inc. VAT
10 Cartridges	@ £33.58 inc. VAT

PLEASE ADD £2.00 Carriage

★ ★ REDUCED TO CLEAR ★ ★

VIGLEN ROM CARTRIDGE SYSTEM

Complete system @ 13.80d. 5 cartridges @ 19.55c
Spare cartridge @ 3.91c 10 cartridges @ 33.58c
Viglen cartridges are compatible with the CARE system

RGB CONVERSION KIT

Please telephone for details
@ 40.25d inc VAT

DON'T BUY A COLOUR MONITOR!!

HAVE YOUR 14" & 16" PHILIPS, PYE or FERGUSON TX COLOUR TV CONVERTED TO A TV/MONITOR
NORMAL TV £50.60a inc VAT
REMOTE CONTROL TV £56.35a inc VAT
TELETEXT TV £62.10a inc VAT

- ★ Image clarity comparable to leading monitors.
- ★ Includes RGB lead for connecting with BBC.
- ★ Conversions carried out at our workshops within 2/3 days.
- ★ Please telephone for other makes.
- ★ Resolution better than 585 × 450 Pixels.

HOW TO ORDER:

By Post. Enclose your Cheque/P.O. made payable to **CARE Electronics.**
Or use your ACCESS. Allow 7 days for delivery. Please add carriage.

OPEN
9am – 5pm Mon-Fri
9am – 4pm Sat

a) @ 8.00 c) @ 1.00
b) @ 5.00 d) @ 2.00

Take the tedium out of data statements with . . .

Data Maker

By MIKE BIBBY

IT'S all Mike Cook's fault really . . . you see Data Maker would never have got into the pages of this magazine if it weren't for him.

Data Maker started life when I was writing Craal, the adventure featured in *The Micro User* last month.

Being a good semi-structured programmer, I had written all the guts of the program before I entered the full room descriptions.

The latter had then to be entered via numerous data statements, so to lighten the chore I wrote Data Maker.

It allows you to simply type in the data itself without having to bother with line numbers and repeatedly typing DATA.

The program stores your data high up in memory – defaulting to &3000 – and when you've finished entering it all, switches PAGE and presents you with the data in program form – ready to be SPOOLed out then EXECed into your own program.

It worked fine but I didn't see much future in it – after all, not all that many people are into writing adventures with lots of data statements.

Then Cookie saw it.

"That's just the thing for tailoring educational programs with lots of data statements to your own requirements", he burbled brightly.

"Yes, I thought that", said I.

"And, of course it's ideal if you've got lots of envelope data or user defined characters to put into a program", he continued.

"Yes, I thought that", I said.

"You could even use it for inputting lots of graphical data from a CAD program. And it's ideal for storing machine code bytes that you can read and poke into memory".

"Yes, I thought that", I lied.

"And it would be a good illustration of how Basic stores its programs . . .

I know when I'm beaten.

"Go away and let me get on with writing the article then", I expleted. So here it is . . .

What Data Maker does is to create a new program consisting entirely of DATA statements high up in memory.

To see how it does this we need to look at how a Basic program is stored.

Figure I illustrates a typical line of Basic.

It begins with two bytes devoted to the line number – most significant byte MSB followed by least significant byte LSB. We then have a byte that contains the total length of the line including line number bytes and all.

There then follows a varying amount of bytes containing the contents of the line. To save space keywords are tokenised – that is, given a one byte number. For example, the code or token for DATA is &DC. Other characters are specified by their Ascii code.

Finally each line has an end-of-line marker, a byte containing &0D, the Ascii for carriage return.

So in memory, a line such as:

```
10 DATA BODGER
```

would appear as in Figure II. Remember, &20 is the code for a space.

At the beginning of a Basic program there is a start marker byte – again having the value &0D. At the end – after the &0D end of line marker of the last line – a Basic program has a final &FF.

So if we are to create a program consisting of DATA statements – with no superfluous spaces – the program would appear as in Figure III.

Data Maker does this by setting HIMEM to &3000 – line 90 – and asking you for "PAGE" – the hex value of where you want your new program in memory – the value is stored in *page%*. On pressing Return with no value, this defaults to &3000 – lines 110-160.

You're then prompted for a line number – lines 170-190 – which is then stored in *line%*. This line number will then automatically increment by 10 – line 350 – for each line of data.

Line 200 pokes &0D into memory location *page%* – this will be the start marker byte of the program we're creating. I then set *pointer%* to *page%* + *1*.

pointer% as its name implies, points to the memory bytes where we're going to store the lines we construct – here it points directly at the byte after the start marker byte.

Lines 210-380 now form the main program loop – each time through we create yet another data line.

Lines 220 and 230 poke the appropriate memory with the most significant and least significant byte of the line number respectively.

Lines 240-260 then input the data required for this line – into *data$*. Note the use of INPUT LINE to allow the use of commas in the data you enter.

So far we have dealt with the two bytes used for the line number – Figure I. Next comes the byte holding the total length of the line.

This length will be the length of *data$* plus an overhead of five bytes – two for the line number, one for the length byte itself, one for the end of line &0D and one byte for the token for DATA.

Line 270 takes care of storing the correct length byte in the appropriate

MSB	LSB	Line length	Tokenised keywords and Ascii characters	End of line marker &0D

Figure I: A typical line of Basic

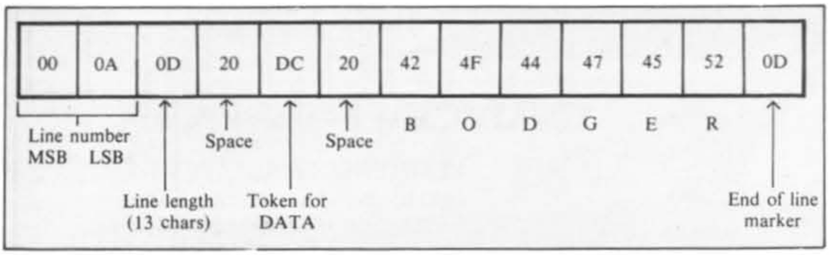

00
0A
0D
20
DC
20
42
4F
44
47
45
52
0D
Line number
MSB LSB
Space
Space
B
O
D
G
E
R
Line length
(13 chars)
Token for
DATA
End of line
marker

Figure II: A Basic line in practice: 10 DATA BODGER

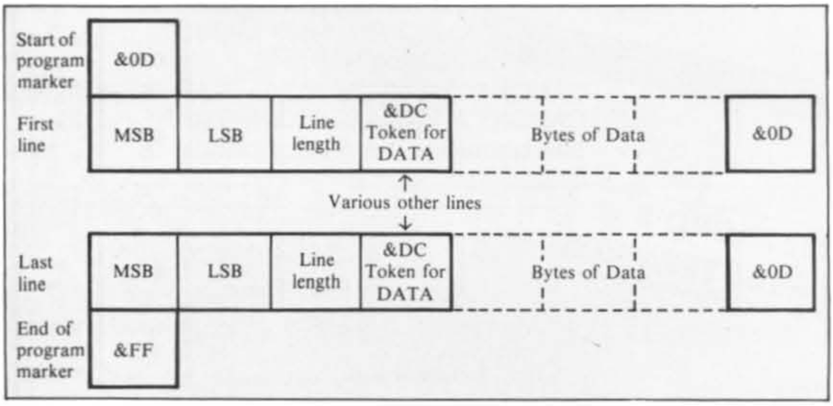

Start of
program
marker
&0D
First
line
MSB
LSB
Line
length
&DC
Token for
DATA
Bytes of Data
&0D
Various other lines
Last
line
MSB
LSB
Line
length
&DC
Token for
DATA
Bytes of Data
&0D
End of
program
marker
&FF

Figure III: Structure of program created by Data Maker

place. Line 280 then follows it with the DATA token – &DC.

We're now ready to poke our data string into memory. We use a new pointer for this, *data%* and give it its initial value in line 290.

Lines 300-320 then poke in the Ascii values of the characters in string *data$* byte by byte.

Line 330 takes advantage of the fact that when you leave a FOR . . . NEXT loop the variable is STEP greater than the final loop parameter. In this case STEP is one. Line 330 thus pokes the &0D that signifies the end of the line into the correct memory location.

Line 340 then updates the value of *pointer%* by adding the length of the line we've just constructed to its old value – we get the length by peeking the length byte, at *pointer%* + 2.

We then increase our line number by 10 – line 350 – and ask if we want another line of data creating – 360,370.

If so we go back to the beginning of our main loop and input another data line. If not we poke the end-of-program byte – &FF – into the final byte – line 390 – and set PAGE to *page%*.

All that remains to do now is to LIST and you'll see your program, full of DATA lines, ready to be saved – SPOOLed – for inclusion in your own programs.

Note that this is a proper Basic program and any mistakes that might have crept in can be edited just like any other Basic program.

Line 80 by the way, sets up function key 0 to return you to normal PAGE so you can list Data Maker. Press f0 if this is your wish.

And that's all there is to it. It really does come in useful in all sorts of ways.

In fact once you've got it, you'll wonder how you ever did without it.

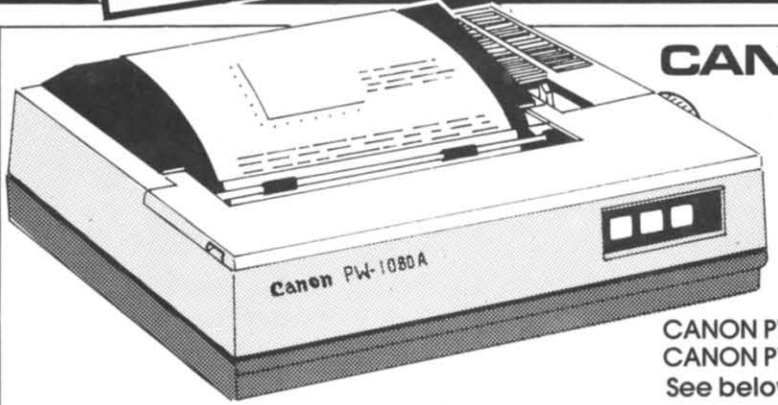
Which is more than can be said of Mike Cook . . .

```
   10 REM ********************
   20 REM *    Data Maker    *
   30 REM *  (c) Micro User  *
   40 REM *    Mike Bibby    *
   50 REM ********************
   60 MODE 7
   70 original% = PAGE
   80 *KEY 0 PAGE = original%  |M OLD
 |M
   90 HIMEM =&3000
  100 data$=STRING$( 255," " )
  110 REPEAT
  120 INPUT "PAGE", page$
  130 IF page$="" THEN page$="&3000"
  140 IF LEFT$(page$,1) <> "&" THEN p
age$= "&" + page$
  150 page% = EVAL(page$)
  160 UNTIL page% >= &3000
  170 REPEAT
  180 INPUT "Line number", line%
  190 UNTIL line% < &8000  AND line%
<> 0
  200 ?page% = &0D: pointer% = page%
+ 1
  210 REPEAT
  220 ?pointer% = line% DIV 256
  230 pointer%?1 = line% MOD 256
  240 REPEAT
  250 INPUT LINE "Data", data$
  260 UNTIL data$ <> ""
  270 pointer%?2 = LEN(data$) + 5
  280 pointer%?3 = &DC
  290 data% = pointer% + 3
  300 FOR offset% = 1 TO LEN(data$)
  310 offset%?data% = ASC( MID$( data
$,offset%,1 ) )
  320 NEXT offset%
  330 offset%?data% = &0D
  340 pointer% = pointer% + ?( pointe
r% + 2 )
  350 line% = line% + 10
  360 PRINT"Next line (Y/N)?"
  370 wait$ = GET$
  380 UNTIL wait$ = "N" OR wait$ = "n
"

  390 ?pointer% = &FF
  400 PAGE = page%
  410 END
```

Once you've got it – you'll wonder how you ever managed without it

QUALITY IN PRINT

Low Prices **Top Service**



CANON PW-1080A

NEAR LETTER QUALITY PRINTER
NLQ Mode 23 x 18 Matrix: 27 cps
Draft Mode 11 x 9 Matrix: 160 cps
Full range of Epson FX 80 Print Codes
Friction & Tractor Feed
Centronics Interface Standard
CANON PW-1156A Available
(Accepts 15" Paper)

CANON PW-1080A £278.26 + VAT = £320.00
CANON PW-1156A £360.00 + VAT = £414.00
See below for Printerpack prices

C.J.E. MICRO'S BBC PRINTERPACKS

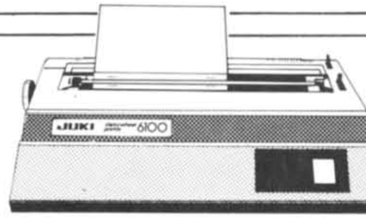
For Star, Canon & Juki Printers include:

1. The Printer
2. 24 Hour Delivery
3. Cable to the BBC 1.3 Metres
4. Screen Dump Program (M/C Source)
5. Text Dump Program
6. Function Key set up Program. For use with WORDWISE
7. Function Key Label Printing Program. For use with above.
8. VIEW Printer Driver
9. 100 Sheets of Paper
10. Mains Plug with 3 Amp Fuse
11. Booklet giving details of using the printer with a BBC.
12. Character Defining Program for Downloadable-character-set

CANON PW-1080A C.J.E. PRINTER PACK £345 Inc. VAT
CANON PW-1156A C.J.E. PRINTER PACK £439 Inc. VAT
JUKI 6100 CJE PRINTER PACK £400 Inc. VAT
GEMINI 10X CJE PRINTER PACK £255 Inc. VAT

CJE MICRO'S BBC PRINTERPACKS

PRINTER CABLES/INTERFACES FOR MOST COMPUTERS STOCKED



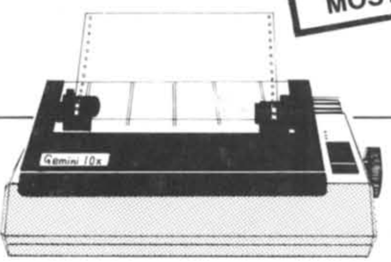
JUKI 6100

One Year Warranty
20 CPS: BiDirectional & Logic Seeking
10, 12, 15 & Proportional Spacing
Wordstar Compatible
2K Buffer: 13 Inch Platen
Underline: Backspace + Lots more
Centronics interface Standard
RS 232 Interface £54.00 + VAT Extra
Tractor Feed £119 + VAT Extra
Single Sheet Feeder £199 + VAT Extra
JUKI 6100 £330.43 + VAT = £380.00
See left for Printerpack prices

JUKI 6300: 40CPS: NOW IN STOCK

SPECIAL RS 232 PRINTER BARGAIN

STAR DP8480 (8" Printing) £187.00 Inc VAT
Ideal for BBC/Newbrain/HX20 & Spectrum Int. 1
Phone for full specification



STAR GEMINI 10X

One Year Warranty
True Descenders 9 x 9 Matrix
120 CPS Bidirectional & Logic Seeking
40, 48, 68, 80, 96, 136 cpl
Italics, Emphasized, Double strike
Super & Sub Scripts
Downloadable Character Set
Hi-Resolution & Block Graphics
Friction or Tractor Feed
10X 10" Carriage, **15X** 15" Carriage
See above for Printerpack prices

Centronics Interface Standard
RS232 Int. £52.00 + VAT Extra
GEMINI 10X £235.00 Inc. VAT
GEMINI 15X £380.00 Inc. VAT

STAR DELTA 10

spec. AS FOR 10X PLUS:—
160CPS: 8K BUFFER
CENTRONICS + RS232 INT'S STD
£311.30 + VAT = £358.00

OFFICIAL ACORN APPROVED DEALER

PRINTAID

Powerful UTILITY for BBC word processors.
Mail Merging.
Easy entry of printer control codes.
Capability for proportional spacing with right-hand justification on Juki 6100
40 or 80 track. £16.00
Send or ring for details.

EXPORT ORDERS WELCOME
VAT INCLUDED WHERE APPLICABLE
PHONE/CREDIT CARD ORDERS WELCOME
Postage 50p per order or as stated
Next day Delivery for Printers/Disk Drives £8.00
FULL RANGE OF CONNECTORS & CABLES AVAILABLE
PRICE LIST ON REQUEST

RING FOR SAMPLE PRINTOUT, FULL SPECIFICATIONS & LATEST PRICES

CJE micro's

Dept MU, 78 Brighton Road, Worthing
W. Sussex BN11 2EN (0903) 213900

FREE WITH EVERY DISC DR
A DISC SECTOR EDITOR
PROGRAM WORTH £10

HIGH QUALITY DRIVES AT EVEN LOWER PRICES.

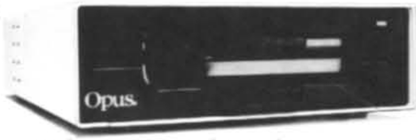
Opus disc drives are the best buys on the market.

We have reduced our prices, but the quality still remains as high as ever.

All our 5¼" drives have been tested to their limits, running for 8,000 hours – that's a year of constant use.

And when you look at our prices, you'll find that VAT, all necessary leads and carriage are included along with a two year guarantee – a year more than any other company can offer.

You can order by posting the coupon below or calling at our showroom.



5¼" SINGLE DISC DRIVES.

- All ½ height.
- Low power consumption.
- Comprehensive manual.
- Free utilities disc.
- Direct drive mechanism.
- Fast access time.

5400 100K Single sided 40 Track	£119.95
5401 100K Single sided 40 Track	£149.95
5402 200K Double sided 40 Track	£169.95
5802 400K Double sided hardware switchable 80/40 Track	£199.95

5¼" DUAL DISC DRIVES.

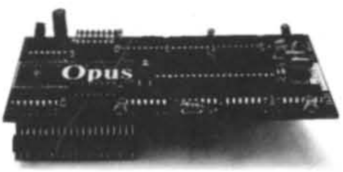
5401 DB 200K/400K 40 Track	£319.95
5402 DB 400K/800K 40 Track	£369.95
5802 DB 800K/1.6 Megabyte 80/40 Track	£399.95

5¼" DUAL DISC DRIVES. WITH POWER SUPPLY

- Metal cased and all necessary leads.
- Separate power supply.
- Utilities disc and manual.

5401D 200K/400K on line S/sided 40 Track	£349.95
5402D 400K/800K on line D/sided 40 Track	£399.95
5802D 800K 1.6 Megabyte on line D/sided hardware switchable 80/40 Track	£429.95

DOUBLE DENSITY DISC INTERFACE.



The ultimate double density disc interface for your BBC Micro Z-80 and 6502 2nd Processor.

- Utilities on ROM including: Format and verify, tape to disc transfer, automatic 40/80 Track selection, automatic density selection, unique mass copy routine, powerful machine code operating system giving up to 248 files, 80% faster than single density. Easy to install. Free user manual supplied. £99.95

FLOPPY DISCS.

3" cartridge **£5.75** each or **£25.95** for 5.

5¼" Discs – with full 5 year warranty and free library case. S/SS/D **£14.95** for 10. S/SD/D **£17.95** for 10. D/SD/D **£19.95** for 10. S/S 80 Track **£22.95** for 10. D/S 80 Track **£24.95** for 10.

GENEROUS EDUCATION AND DEALER DISCOUNTS GIVEN. ALL ITEMS ARE GUARANTEED FOR TWO YEARS.

OPUS PRODUCTS ARE AVAILABLE FROM BOOTS, SPECTRUM, JOHN MENZIES, ALLDERS AND OTHER GOOD COMPUTER STORES NATIONWIDE.

OPUS SUPPLIES LTD.

158 Camberwell Road, London SE5 0EE.
Opening hours:
9.00-5.30pm Monday to Friday.

☎ 01-701 8668
01-703 6155
Telex: 295931

To: Opus Supplies Ltd., 158 Camberwell Road, London SE5 0EE. Please rush me the following: **(ALL PRICES INCLUDE VAT & CARRIAGE.)**

Quantity	Description	Price
	TOTAL	

I enclose a cheque for £________
Or please debit my credit card account with

the amount of £________
My Access/Barclaycard (please tick) No. is

Name________
Address________

Telephone________

Opus.
Opus Supplies Ltd.

BU12

Are YOU getting the most from your BBC Micro?

You can – with this book from The Micro User!

THIS month sees the launch of a new publishing venture – a series of books that will form a comprehensive library covering all the best programming techniques for the BBC Micro.

The first in the series, "Getting Started in Sounds & Graphics", is now available.

In this compilation of their highly praised series of articles in *The Micro User*, Michael Noels, Paul Jones and Nigel Peters explore the BBC Micro's outstanding sound and graphics capabilities.

Step by step, with clear explanations and lots of examples, they show you how to harness the power of your micro to create dazzling displays and superb sound.

Assuming only a rudimentary knowledge of Basic, the authors thoroughly explain all the programming methods involved, ranging from the simplest to the most complex.

Lots of books describe the BBC Micro's graphics and sound capabilities – this one shows you how to exploit their tremendous potential to the full.

The chapters include:

- ★ *Exploring the screen modes and the use of colour*
- ★ *Using the text and graphics screens – MOVE and DRAW*
- ★ *Filling areas of colour with PLOT 85*
- ★ *Exploiting text and graphics windows*
- ★ *Creating new coordinate systems for your graphics*
- ★ *Drawing circles, a general procedure*
- ★ *Building your own user-defined characters*
- ★ *Combining colours logically, multiplane images*
- ★ *Using Exclusive OR and Invert*
- ★ *Rubber-banding revealed*
- ★ *Finding out about Teletext*
- ★ *Mastering Teletext graphics*
- ★ *Starting sound – the basic ideas*
- ★ *Making music – the first steps*
- ★ *Queuing – the ins and outs of channels*
- ★ *Synchronising sound with the U parameter*
- ★ *Creating special effects with channel 0*
- ★ *Addressing the envelope, giving sound some shape*
- ★ *Louder still and louder – envelopes licked!*

Please send me "Getting Started in Sound & Graphics".

☐ I enclose my cheque made payable to Database Publications for £5.95.

☐ Please debit my Access/Visa account.

No. ____________________

Signed ____________________

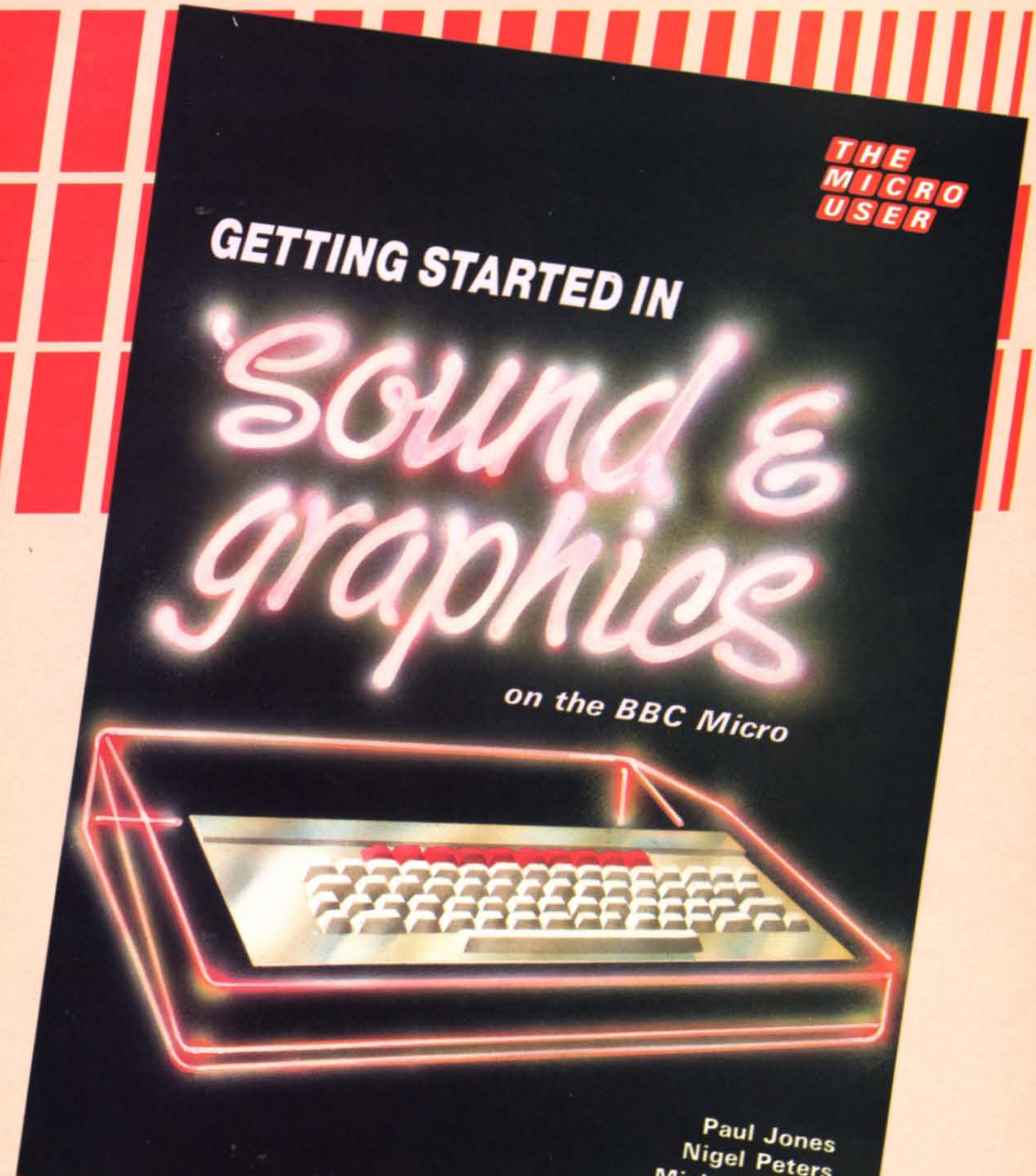
Name ____________________

Address ____________________

____

Send to: Getting Started Offer, Database Publications,
68 Chester Road, Hazel Grove, Stockport SK7 5NY.

MU3



THE MICRO USER

GETTING STARTED IN

Sound & graphics

on the BBC Micro

Paul Jones
Nigel Peters
Michael Noels

DATABASE PUBLICATIONS

You should see what he's just seen.

Micronet 800.

Stretching the mind of your micro far beyond its limits.

Micro evolution continues with this unique communications, information and software system. Set on our mainframes nationwide.

Includes 30,000 pages and access to Prestel™ with its full range of services.

A tremendous Communications section that networks you to thousands of other members across the country. Send and receive electronic messages and graphics at a touch of a button.

And there's the Chatline service, Swapshop and Teleshopping.

Check with daily updates on the very latest computer news.

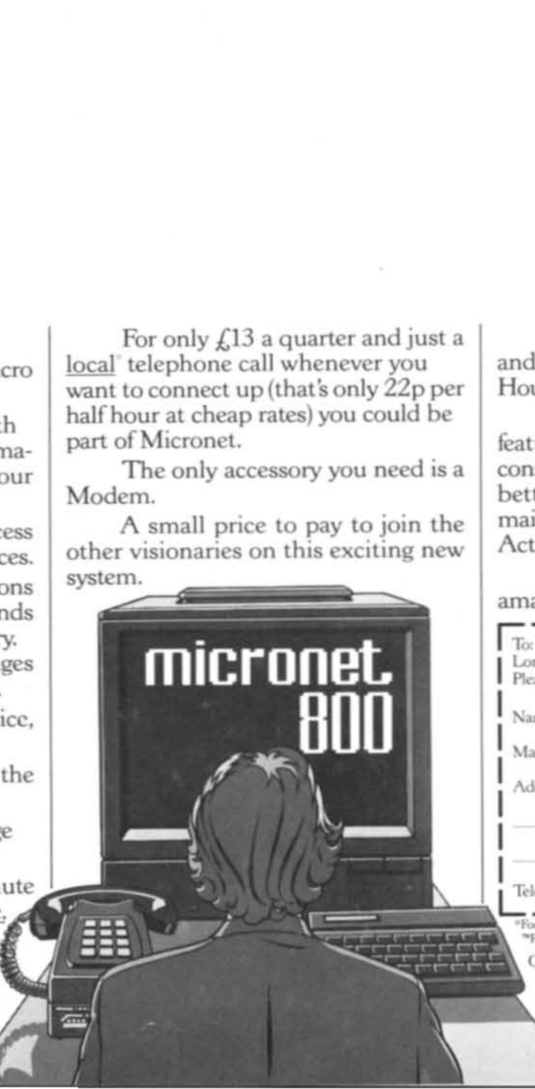
Micronet also has its own huge facts data base.

And a choice of up-to-the-minute software to download absolutely free.

For only £13 a quarter and just a local[*] telephone call whenever you want to connect up (that's only 22p per half hour at cheap rates) you could be part of Micronet.

The only accessory you need is a Modem.

A small price to pay to join the other visionaries on this exciting new system.



Fill in the coupon for more details and send to Micronet 800, Durrant House, 8 Herbal Hill, London EC1R 5EJ.

But be warned, Micronet 800's features are almost limitless and constantly updating. So maybe you'd be better to call in at Laskys, John Lewis, main Boots or your local Micronet 800 Action Station.

To feast your eyes on all the amazing things it can do.

To: MICRONET 800, Durrant House, 8 Herbal Hill, London EC1R 5EJ. Telephone 01-278 3143.
Please send me the full facts about Micronet 800.

Name ________________

Make/Model of Micro ________________

Address ________________

____

____

Telephone ________________

MU3

[*] For 97% of telephone users.

™Prestel is a trademark of British Telecommunications.

On Prestel

See Micronet 800 in action.

AVON

Bath. Boots, 1 Marchants Passage, Southgate. Tel: 0225 64402.

Bristol. Avon Computer Rentals, 16 West Street, Old Market. Tel: 0272 550600.

Bristol. Boots, 59 Broadmead. Tel: 0272 293631.

Bristol. Laskys, 16-20 Penn Street. Tel: 0272 20421.

Keynsham. Key Computer Systems 42b High Street. Tel: 02756 5575.

Weston-super-Mare. K & K Computers, 32 Alfred Street. Tel: 0934 419324.

BEDFORDSHIRE

Bedford. Boots, The Harpur Centre, Harpur Street. Tel: 0234 56231.

Dunstable. Dormans, 7-11 Broad Walk. Tel: 0582 38302.

Leighton Buzzard. Datasine, 59 North Street. Tel: 0525 374200.

Leighton Buzzard. Milton Keynes Music & Computers, 17 Bridge Street. Tel: 0525 382504.

Luton. Hobbyte, Unit 16, The Arndale Centre. Tel: 0582 457195.

Luton. Laskys, 190-192 Arndale Centre. Tel: 0582 38302.

Luton. Terry More, 49 George Street. Tel: 0582 23391.

BERKSHIRE

Reading. Laskys, 118-119 Priar St. Tel: 0734 595459.

Slough. Data Supplies, Templewood Lane, Farnham Common. Tel: 2 820004.

Slough. Laskys, 75 Queensmere Centre. Tel: 0753 78269.

Slough. MV Games, 245 High Street. Tel: 75 21594.

BUCKINGHAMSHIRE

Bletchley. RAMS Computer Centre, 117 Queensway. Tel: 0908 647744.

Chesham. Reed Photo & Computers, 113 High Street. Tel: 0494 783373.

CAMBRIDGESHIRE

Cambridge. Boots, 65-67 Sidney Street and 28 Petty Curry Street. Tel: 0223 350213

Cambridge. Cambridge Computer Store, 4 Emmanuel Street. Tel: 0223 358264

Cambridge. Heffers Stationers. 19 Sidney Street. Tel: 0223 358241.

Peterborough. Boots, 40-42 Bridge Street, Queensgate. Tel: 0733 65352.

CHESHIRE

Chester. Boots, 47-55 Foregate Street. Tel: 0244 28421

Chester. Computer Link, 21 St. Werburgh Street. Tel: 0244 316516.

Chester. Laskys, 7 The Forum, Northgate Street. Tel: 0244 317667.

Crewe. Midshires Computer Centre, 68-78 Nantwich Road. Tel: 0270 211086

Ellesmere Port. RFR TV & Audio, 1 Pooltown Road, Whitby. Tel: 051-356 4150.

Hyde. C Tech Computers, 184 Market Street. Tel: 061-366 8223.

Macclesfield. Camera Computer Centre, 118 Mill Street. 0625 27468

Macclesfield. Computer Centre, 68 Chestergate. Tel: 0625 618827.

Marple. Marple Computer Centre, 30-32 Market Street. Tel: 061-427 4328

Stockport. National Micro Centres, 36 St Petersgate. Tel: 061-429 8080

Stockport. Stockport Micro Centre, 4-6 Brown Street.

Widnes. Computer City, 78 Victoria Road. Tel: 051-420 3333.

Wilmslow. Wilmslow Micro Centre. 62 Grove Street. Tel: 0625 530890.

CLEVELAND

Middlesbrough. Boots, 88-90 Linthorpe Road, The Cleveland Centre. Tel: 0642 249616.

CUMBRIA

Kendal. The Kendal Computer Centre, Stramongate. Tel: 0539 22559.

Penrith. Penrith Communications, 14 Castlegate. Tel: 0768 67146.

Whitehaven. P D Hendren, 15 King Street. Tel: 0946 2063.

Workington. Technology Store, 12 Finkle Street. Tel: 0900 66972.

DERBYSHIRE

Alfreton. Gordon Harwood, 67-71 High Street. Tel: 0733 836781.

Chesterfield. Boots, 35-37 Low Pavement, Market Place. Tel: 0246 203591.

Chesterfield. Computer Stores, 14 Stephenson Place. Tel: 0246 208802.

Derby. Boots, 1 Devonshire Walk. Tel: 0322 45886.

DEVON

Exeter. Boots, 251 High Street, Tel: 0392 32244.

Exeter. Open Channel, Central Station, Queen Street. Tel: 0392 218187.

Paignton. Computer Systems Ltd, 35 Hyde Road. Tel: 0803 524284.

Plymouth. Syntax, 76 Cornwall Street. Tel: 0752 28705.

Seaton. Curtis Computer Services, Seaton Computer Shop, 51c Harbour Road. Tel: 0297 22347.

Tiverton. Actron Microcomputers, 37 Bampton Street. Tel: 0884 252854.

DORSET

Bournemouth. Brook Computers, 370 Charminster Road. Tel: 0202 533054.

Bournemouth. Lansdowne Computer Centre, 1 Lansdowne Crescent, Lansdowne. Tel: 0202 20165.

Dorchester. The Paper Shop, Kings Road. Tel: 0305 64564.

Poole. Lansdowne Computer Centre, 14 Arndale Centre. Tel: 0202 670901.

ESSEX

Basildon. Basildon Software Centre, 78-80 Liberty Shopping Hall, East Square. Tel: 0268 27922.

Chelmsford. Maxton Hayman, 5 Broomfield Road. Tel: 0245 354595

Chelmsford. Way In Computers, 7 Village Square, Chelmer Village. Tel: 0245 467858.

Colchester. Boots, 5-6 Lion Walk. Tel: 0206 577303.

Grays. H. Reynolds, 28a Southend Road. Tel: 0375 31641.

Harlow. Harlow Computer Centre, 17 Staple Tye. Tel: 0279 22846.

Harlow. Laskys, 19 The Harvey Centre. Tel: 0279 443495.

Hornchurch. Comptel Computer Systems, 112a North Street. Tel: 0402 446741.

Ilford. Boots, 177-185 High Road. Tel: 01-553 2116.

Romford. Software Plus, 72 North Street. Tel: 70 65271.

Southend-on-Sea. Computerama, 88 London Road. Tel: 0702 335443.

Southend-on-Sea. Computer Centre, 336 London Road. Tel: 0702 337161.

Southend-on-Sea. Estuary Personal Computers, 318 Chartwell North, Victoria Circus Shopping Centre. Tel: 0702 614131.

GLOUCESTER

Cheltenham. Laskys, 206 High Street. Tel: 0242 570282.

Cheltenham. Screen Scene, 144 St. Georges Road. Tel: 0242 528979.

Gloucester. Boots, 38-46 Eastgate Street. Tel: 0452 423501.

HAMPSHIRE

Basingstoke. Fishers, 2-3 Market Place. Tel: 0256 22079.

Southampton. Business Electronics, Micromagic At Atkins, 7 Civic Centre Road. Tel: 0703 25903.

Waterlooville. GB Microland, 7 Queens Parade, London Road. Tel: 0705 259911.

HERTFORD

Hitchin. County Computers, 13 Bucklesbury. Tel: 0462 36757.

Potters Bar. the Computer Shop, 107 High Street. Tel: 0707 44417.

Stevenage. DJ Computers, 11 Town Square. Tel: 0438 65501.

Watford. Laskys, 18 Charter Place. Tel: 0923 31905.

Watford. SRS Microsystems, 94 The Parade, High Street. Tel: 0923 26602.

Watford. Watford Electronics, Cardiff Road. Tel: 0923 405588.

Welwyn Garden City. DJ Computers, 40 Fretherne Road. Tel: 96 28444.

HUMBERSIDE

Beverley. Computing World, 10 Swabys Yard, Dyer Lane. Tel: 0482 881831.

KENT

Ashford. DGH, 10 North Street. Tel: 0233 32597.

Ashford. Geerings of Ashford, 80 High Street. Tel: 0233 33366.

Bexleyheath. Laskys, 15-16 Broadway Shopping Centre. Tel: 01-301 3478.

Bromley. Boots, 148-154 High Street. Tel: 01-460 6688.

Bromley. Computers Today. 31 Market Square. Tel: 01-290 5652.

Bromley. Laskys, 22 Market Square. Tel: 01-464 7829.

Bromley. Walters Computers, Army & Navy, 64 High Street. Tel: 01-460 9991.

Chatham. Boots, 30-34 Wilmott Square, Pentagon Centre. Tel: 0634 405471.

KENT

Gravesend. Gravesend Home Computers, 39 The Terrace. Tel: 0474 23871.

Gillingham. Regal Software Supplies, 49 High Street. Tel: 0634 579634.

Maidstone. Kent Micros, 51 Union Street. Tel: 0622 52784.

Rainham. Microway Computers, 39 High Street. Tel: 0634 376702.

Sevenoaks. Ernest Fielder Computers, Dorset Street. Tel: 0732 456800.

Shortlands. The Village House of Computers, 87 Beckenham Lane. Tel: 01-460 7122.

Sittingbourne. Computer Plus, 65 High Street. Tel: 0795 25677.

Tunbridge Wells. Modata Computer Centre, 28-30 St. Johns Road. Tel: 0892 41555.

LANCASHIRE

Blackburn. Tempo Computers, 9 Railway Road. Tel: 0254 691333.

Blackpool. Blackpool Computer Store, 179 Church Street. Tel: 0253 20239.

Burnley. IMO Business Systems, 39-43 Standish Street. Tel: 0282 54299.

Preston. 4Mat Computing, 67 Friargate. tel: 0772 561952.

Preston. Laskys, 1-4 Guildhall Arcade. Tel: 0772 24558.

Wigan. Wildings Computer Centre, 11 Mesnes Street. Tel: 0942 22382.

LEICESTERSHIRE

Leicester. Boots, 30-36 Gallowtree Gate. Tel: 0533 21641.

Market Harborough. Harborough Home Computers, 7 Church Street. Tel: 0858 63056.

LONDON

W1. Computers of Wigmore Street, 104 Wigmore Street. Tel: 01 486 0373.

W1. HMV, 363 Oxford Street. Tel: 01-629 1240.

W1. Laskys, 42 Tottenham Court Road. Tel: 01-636 0845.

W1. Lion House, 227 Tottenham Court Road. Tel: 01-637 1601.

W1. Sonic Foto Micro Center, 256 Tottenham Court Road. Tel: 01-580 5826.

W1. Tomorrows World Today, 27 Oxford Street. Tel: 01-439 7799.

W1. Walters Computers, DH Evans, Oxford Street. Tel: 01-629 8800.

WC1. Transam Micro Systems, 59-61 Theobalds Road. Tel: 01-405 5240.

W8. Walters Computers, Barkers, Kensington High Street. Tel: 01-937 5432.

SE7. Vic Oddens Micros, 5 London Bridge Walk. Tel: 01-403 1988.

SE9. Square Deal, 373-375 Footscray Road, New Eltham. Tel: 01-859 1516.

Lewisham. Laskys, 164 High Street. Tel: 01-852 1375.

SE15. Castlehurst Ltd, 152 Rye Lane, Peckham. Tel: 01-639 2205.

EC2. Devron Computer centre, 155 Moorgate. tel: 01-638 3339.

N14. Logic Sales, 19 The Bourne, The Broadway, Southgate. Tel: 01-882 4942.

N22. Boots, 38-40 High Road, Wood Green. Tel: 01-881 0101.

NW3. Maycraft Micros, 58 Rosslyn Hill, Hampstead. Tel: 01-431 1300.

NW4. Davinci Computer Store, 112 Brent Street, Hendon. Tel: 01-202 2272.

NW7. Computers Inc, 86 Golders Green. Tel: 01- 209 0401.

NW10. Technomatic, 17 Burnley Road, Wembley. Tel: 01-208 1177.

MANCHESTER

Bolton. Computer World UK Ltd, 208 Chorley Old Road. Tel: 0204 494304.

Manchester. Boots, 32 Market Street. Tel: 061-832 6533.

Manchester. Laskys, 61 Arndale Centre. Tel: 061-833 9149.

Manchester. Laskys, 12-14 St. Marys Gate. Tel: 061-833 0268.

Manchester. Mighty Micro, Sherwood Centre, 268 Wilmslow Road, Fallowfield. Tel: 061-224 8117.

Manchester. NSC Computer Shops, 29 Hanging Ditch. Tel: 061-832 2269.

Manchester. Walters Computers, Kendal Milne, Deansgate. Tel: 061-832 3414.

Oldham. Home & Business Computers, 54 Yorkshire Street. Tel: 061-633 1608.

Swinton. Mr Micro, 69 Partington Lane. Tel: 061-728 2282.

MERSEYSIDE

Heswall. Thornguard Computer Systems, 46 Pensby Road. Tel: 051-342 7516.

Liverpool. Hargreaves, 31-37 Warbreck Moor, Walton. Tel: 051-525 1782.

Liverpool. Laskys, Dale Street. Tel: 051-236 3298.

Liverpool. Laskys, St. Johns Precinct. Tel: 051-708 5871.

St. Helens. Microman Computers, Rainford Industrial Estate, Mill Lane Rainford. Tel: 0744 885242.

Southport. Central Studios, 38 Eastbank Street. Tel: 0704 31881.

MIDDLESEX

Enfield. Laskys, 44-48 Palace Garden Shopping Centre. Tel: 01-363 6627.

Harrow. Camera Arts, 42 St. Anns Road. Tel: 01-427 5469.

Harrow. Harrow Micro, 24 Springfield Road. Tel: 01-427 0098.

Hounslow. Boots, 193-199 High Street. Tel: 01-570 0156.

Southall. Twillstar Computers Ltd, 7 Regina Road. Tel: 01-574 5271.

Teddington. Andrews, Broad Street. Tel: 01-997 4716.

Twickenham. Twickenham Computer Centre, 72 Heath Road. Tel: 01-892 7896.

Uxbridge. JKL Computers, 7 Windsor Street. Tel: 0895 51815.

NORFOLK

Norwich. Adams, 125-129 King Street. Tel: 0603 22129.

NOTTINGHAMSHIRE

Sutton in Ashfield. HN & L Fisher, 87 Outram Street. Tel: 0623 54734.

Nottingham. Laskys, 1-4 Smithy Row. Tel: 0602 413049.

OXFORDSHIRE

Abingdon. Ivor Fields Computers, 21 Stern Street. tel: 0235 21207.

Banbury. Computer Plus, 2 Church lane. Tel; 0295 55890.

Oxford. Absolute Sound & Video, 19 Old High Street, Headington. Tel: 0865 65661.

Oxford. Science Studio, 7 Little Clarendon Street. Tel: 0865 54022.

SCOTLAND

Aberdeen. Boots, 133-141 Union Street. Tel: 0224 585349.

Edinburgh. Boots, 101-103 Princes Street. Tel: 031-225 8331.

Edinburgh. Laskys, 4 St. James Centre. Tel: 031-556 1864.

Glasgow. Boots, 200 Sauchiehall Street. Tel; 041-332 1925.

Glasgow. Boots, Union Street and Argyle Street. Tel; 041-248 7387.

Glasgow. Tom Dixon Cameras, 15-17 Queen Street. Tel: 041-204 0826.

SHROPSHIRE

Shrewsbury. Clairmont Enterprises, Hills Lane. Tel: 3647 52949.

Shrewsbury. Computerama, 13 Castlegate. Tel: 0743 60528.

Telford. Computer Village Ltd, 2/3 Hazeldine House, Central Square. Tel: 0952 506771.

Telford. Telford Electronics, 38 Mall 4. Tel: 0952 504911.

STAFFORDSHIRE

Newcastle-under-Lyme. Computer Cabin, 24 The Parade, Silverdale. Tel: 0782 636911.

Stafford. Computerama, 59 Foregate Street. Tel: 0785 41899.

Stoke-on-Trent. Computerama, 11 Market Square Arcade, Hanley. Tel: 0782 268524.

SUFFOLK

Bury St. Edmunds. Boots, 11-13 Cornhill. Tel: 0284 701516.

Bury St. Edmunds. The Computer Centre, 1-3 Garland Street. Tel: 0284 705503.

Ipswich. Brainwave Micros, 24 Crown Street. Tel: 047 350965.

SURREY

Bagshot. P & H Electronics, 22-24 Guildford Road. Tel: 0276 73078.

Croydon. Laskys, 77-81 North End. Tel: 01-681 8443.

Croydon. The Vision Store, 53-59 High Street. Tel: 01-686 6362.

Croydon. The Vision Store, 96-98 North End. Tel: 01-681 7539.

South Croydon. Concise Computer Consultants, 1 Carlton Road. Tel: 01-681 6842.

Epsom. The Micro Workshop, 12 Station Approach. Tel: 0372 721533.

Guildford. Walters Computers, Army & Navy, 105-111 High Street. Tel: 0483 68171.

Wallington. Surrey Micro Systems, 53 Woodcote Road. Tel: 01-647 5636.

SURREY

Woking. Harpers, 71-73 Commercial Way. Tel: 0486 225657.

SUSSEX

Bexhill-on-Sea. Computerware, 22 St. Leonards Road. Tel: 0424 223340.

Brighton. Boots, 129 North Street. Tel: 0273 27088.

Brighton. Gamer, 71 East Street. Tel: 0273 728681.

Brighton. Laskys, 151-152 Western Road. Tel: 0273 725625.

Crawley. Gatwick Computers, 62 The Boulevard. Tel: 0293 37842.

Crawley. Laskys, 6-8 Queensway. Tel: 0293 544622.

Eastbourne. Boots, 15 Eastbourne Arndale Centre. Tel:

TYNE & WEAR

Gateshead. DP Supplies, St. Andrews House, Westfield Terrace. Tel: 0632 785068.

Newcastle-upon-Tyne. Boots, Eldon Square. Tel: 0632 329844.

Newcastle-upon-Tyne. Laskys, 6 Northumberland Street. Tel: 0632 617224.

Newcastle-upon-Tyne. RE Computing, 12 Jesmond Road. Tel: 0632 815580.

WALES

Aberdare. Inkey Computer Services, 70 Mill Street, The Square, Trecynon. Tel: 0685 881828.

Aberystwyth. Aberdata at Galloways, 23 Pier Street. Tel: 0970 615522.

Cardiff. Boots, 26 Queens Street & 105 Frederick Street. Tel: 0222 31291.

Cardiff. P & P Computers. 41 The Hayes. Tel; 0222 26666.

Swansea. Boots, 17 St. Marys Arcade, The Quadrant Shopping Centre. Tel: 0792 43461.

WARWICKSHIRE

Coventry. Coventry Micro Centre, 33 Far Gosford Street. Tel: 0203 58942.

Coventry. Impulse Computer World, 60 Hertford Street Precinct. Tel: 0203 553701.

Coventry. JBC Micro Services, 200 Earlsdon Avenue, North Earlsdon. Tel: 0203 73813.

Coventry. Laskys, Lower Precinct. Tel: 0203 27712.

Leamington Spa. IC Computers, 43 Russell Street. Tel: 0926 36244.

Leamington Spa. Leamington Hobby Centre, 121 Regent Street. Tel: 0926 29211.

Nuneaton. Micro City, 1a Queens Road. Tel: 0203 382049.

Rugby. O.E.M., 9-11 Regent Street. Tel: 0788 70522.

WEST MIDLANDS

Birmingham. Boots, City Centre House, 16-17 New Street. Tel: 021-643 7582.

Birmingham. Laskys, 19-21 Corporation Street. Tel: 021-632 6303.

Dudley. Central Computers, 35 Churchill Precinct. Tel: 0384 238169.

Stourbridge. Walters Computer Systems. 12 Hagley Road. Tel: 0384 370811.

Walsall. New Horizon, 1 Goodall Street. Tel: 0922 24821.

West Bromwich. DS Peakman, 7 Queens Square. Tel: 021-525 7910.

Wolverhampton. Laskys, 2 Wulfrum Square. Tel: 0902 714568.

YORKSHIRE

Bradford. Boots, 11 Darley Street. Tel: 0274 390891.

Leeds. Boots, 19 Albion Arcade, Bond Street Centre. Tel: 0532 33551.

Sheffield. Laskys, 58 Leopold Street. Tel: 0742 750971.

York. York Computer Centre, 7 Stonegate Arcade. Tel: 0904 641862.

micronet 800

COMMAND PERFORMANCE

Featuring the FX80 dot matrix printer

JIM NOTMAN
looks at control codes

THE FX80 is a good quality, fast and highly versatile dot matrix printer, but the sheer number of commands – over 70 – can make it appear rather intimidating at first. This is not helped by the examples in the manual being given in Microsoft Basic, which is more suited to an Apple or a TRS-80 than a BBC Micro.

Hopefully this article will make things clearer. Although we're dealing with the FX80, the principles involved are applicable to most printers.

Each character used in a computer is stored as a number between 0 and 255. There is a code, Ascii (American standard code for information interchange) which tries to standardise the codes used in computers and printers.

The standard itself only defines the codes between 0 and 127. Most of the codes, 32 to 126, are printable characters.

When the American character set is used with the FX80 all the characters except one are the same as the BBC in screen Modes 0 to 6.

The exception is character number 96, which the BBC prints as a £ sign and the Epson as a ’.

Code numbers 0 to 31 and 127 are referred to as the control characters or codes as they control the special functions of the printer.

Micros can also deal with numbers between 128 and 255. The BBC has a further group of control codes 128-159. These are used in Mode 7 as the teletext control characters.

In modes 0 to 6, codes 160 to 255 can be used to define new characters (in Mode 7 codes 160 to 254 produce the same character set as those from 32 to 126 with character 255 printing a solid block).

The Epson codes 160 to 254 print a character set similar to those of 32 to 126 but this time in italics.

Two important codes to know about are line feed (character 10) and carriage return (character 13).

Line feed makes the printer "wind on" to the next line and carriage return makes the printer go back to the start of the line.

With older printers both of these characters were needed. Normally the BBC "filters out" line feeds from its output to printers, but this can be changed by the *FX6,x command, where x is the number of the character to be filtered out.

The Epson, however, can easily be made to produce its own line feeds automatically by setting one of a number of small DIL switches (number 2-4) found under a cover on the right side of the printer.

The advantage with automatic line feeds is that you never need to worry about adding *FX6 commands to all your programs which access the printer, though you must watch for one or two pieces of software that add extra line feeds.

While the switch cover is off a number of other options can be set, such as "crossing" the zeros (this aids legibility) and the international character set that is available at switch on time (a choice of 9).

Some people are confused by the different commands which send characters to the screen and printer.

To put the letter "A" on the screen, the most obvious way is PRINT "A". Not only does this print A on the screen, but also the prompt '>' and cursor move onto the next line because the BBC automatically sends a line feed and carriage return at the end of each PRINT statement.

To print "A" to the screen without the prompt and cursor going onto the next line a semicolon must be added to the end of the statement – such as PRINT "A"; The 'A' is stored in the Beeb as number 65 (Ascii code).

```
PRINT CHR$(65);
VDU 65
```

will both put "A" on the screen. The advantage of VDU is that only the characters specified are sent without any carriage return problems.

With text, such as a listing, all that needs to be done is to enable printer output by pressing Ctrl B.

After this all the characters that are sent to the screen are also sent to the printer. To stop the BBC sending characters to the printer press Ctrl C.

In programs VDU2 has the same effect as Ctrl B and VDU3 the same as

→

From Page 115

Ctrl C.

Problems can arise with control characters because they mean different things to the BBC and printer. For example, VDU12 in the BBC will clear the screen. In the printer it causes the paper to wind on to the start of the next sheet.

Many of the Basic commands such as MOVE, PLOT, MODE, GCOL, CLG and CLS send control codes.

To avoid this problem with control codes when writing programs for printer use, it is best to enable output to the printer only when text needs to be printed and disable the printer output immediately afterwards.

To send characters to the printer without them being sent to the screen the VDU1,x command can be used, where x is any code between 0 and 255.

As with any VDU command, they can be sent in long streams of code.

Remember that to send any character to the printer the output must be enabled first with VDU2.

In the manual most of the commands are given with an Ascii character instead of the Ascii code. The code is easier and shorter to use with VDU statements.

It is possible to VDU1, ASC"A", but it's quicker to write VDU1,65.

It is a good idea to go through the manual, writing in the equivalent code for each command by using the PRINT ASC "letter" command to find the code.

A small number of commands require only a single character to be sent to the printer, for example:

VDU1,14 sets the enlarged mode (until a character return).

VDU1,15 sets the condensed mode.

VDU1,18 cancels the condensed mode.

Most of the commands sent to the printer are preceded by the 'escape character' (character 27):

VDU 1,27,1,45,1,48 sends the characters 27, 45 and 48 to the printer, setting the underline mode.

VDU 1,27,1,45,49 cancels the underline mode.

VDU 1,27,1,108,1,5 sets the left hand margin to 5.

VDU 1,27,1,112,1,1 set proportional spacing mode.

The FX80 keeps a copy of nine different character sets in ROM. It also has an area of RAM which can be used either as an area to store new character definitions or as a buffer to store the micro's output till the printer is ready for it.

The function it performs depends on one of the DIL switch settings (1-4 must be off to define characters).

As was mentioned before, the FX80 has a similar character set to that of the BBC Micro. To make them the same four different tasks must be performed.

First, if the American character set has not been selected by altering the DIL switches, it can be set by software:

VDU 1,27,1,82,1,0

Next, this character set information must be transferred into the RAM area of the printer from its ROM. This is done by:

VDU 1,27,1,58,1,0,1,0,1,0

Now the £ sign must be defined as character number 96.

The Epson uses a 9 x 11 matrix to design its characters. Effectively this is defined as a 8 x 11 matrix, with an "attribute" byte determining where the character should be placed with reference to the lowest possible position on the line.

You'll need a grid like Figure I to draw the character. Notice the placing of the £ sign so it will rest on the line, level with most of the other characters.

There is a restriction in placing the dots. Adjacent dots on the same horizontal level are not allowed.

The numbers on the left of the grid refer to the bit value for each row of boxes.

Now total up the values of the boxes marked in each column. These are printed at the foot of each column.

The attribute byte can now be calculated. Three pieces of data are required – see Figure II.

The left hand bit value 128 controls the vertical position of the character. When set (as in this case) the character is one row higher on the line (see Figure III).

The remainder of the bits are required in proportional printing. The next three bits show the start position of the character and the remaining four bits the end.

VDU 1,27,1,38,1,0,1,96,1,136,1,18, 1,0,1,126,1,128,1,2,1,18,1,2,1,128,1, 66,1,0,1,0

The code 27,38,0 warns the printer a character definition is coming. 96,96 refers to the start and end Ascii numbers to be defined (the same for one character), 136 the attribute byte with the 11 data values following.

Now the printer must be told to use the character set that has been defined in RAM:

VDU 1,27,1,37,1,1,1,0

The following program combines these statements as well as showing a routine to deal with long streams of data without having to count all the VDU1s:

```
   10 REM Jim Notman
   20 REM Gives an FX-80 a BBC charac
ter set
   30 READ A%
   40 VDU2
   50 REPEAT
   60 VDU1,A%
   70 READ A%
   80 UNTIL A%=999
   90 VDU3
  100 DATA27,82,0
  110 DATA27,58,0,0,0
  120 DATA27,38,0,96,96,136,18,0,126,
128,18,128,2,128,66,0,0
  130 DATA27,37,1,0
  140 DATA999
```

When defining and testing character definitions on the Epson do try **VDU 1,27,1,105,1,49.** You should find it very useful.

VDU 1,27,1,105,1,48 switches it off.

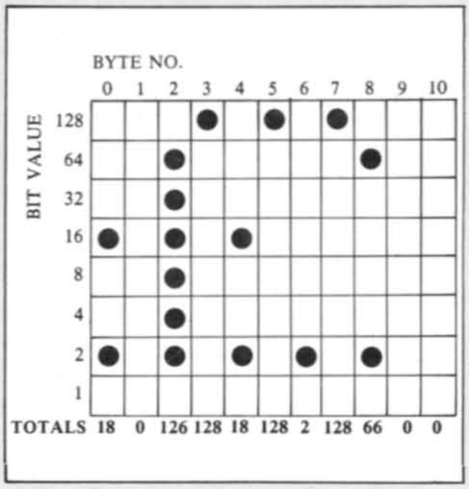


Figure I

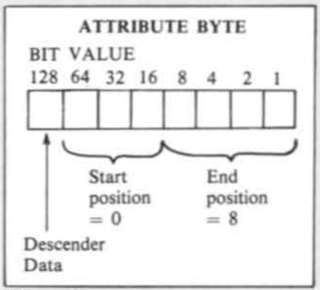
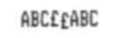


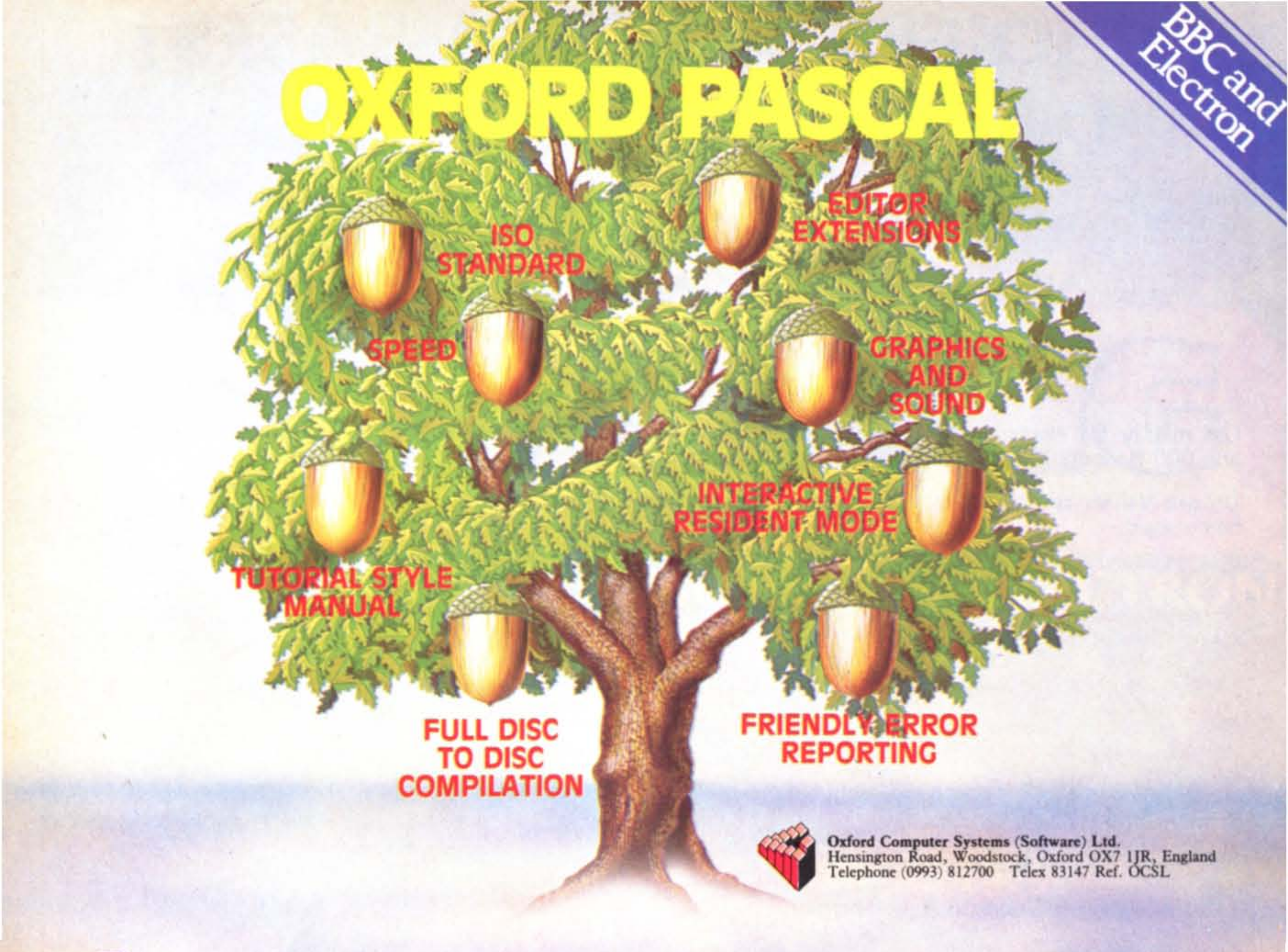
Figure II



ABC££ABC

Left hand £ sign: descender data bit set.
Right hand £ sign: descender data bit not set.

Figure III



Oxford Computer Systems (Software) Ltd.
Hensington Road, Woodstock, Oxford OX7 1JR, England
Telephone (0993) 812700 Telex 83147 Ref. OCSL

Compilers like these don't grow on trees

Oxford Pascal is Fast

Oxford Pascal compiles down to FAST COMPACT P-code, giving you the real speed and power of Pascal, together with the ability to compile very large programs.

Oxford Pascal is Standard

Oxford Pascal is a full extended implementation of Standard ISO Pascal. This means that you can compile any Pascal program (subject to size), written on any computer, anywhere.

Oxford Pascal is Compact

Because it compiles into P-code, Oxford Pascal reduces programs into the most compact form possible. In fact it allows you to pack more code into your BEEB than any other language, and should your programs become too large, you can still use the CHAIN command to overlay limitless additional programs without losing data.

Graphics & Sound Extensions

In addition to the entire Pascal language, Oxford Pascal features a whole range of Graphics (all modes) and sound extensions designed to make maximum use of the BBC Computer. Oxford Pascal also provides numerous extensions such as hexadecimal arithmetic and bit manipulation instructions.

Oxford Pascal in Education

In Education, Oxford Pascal is fast becoming a *de facto* standard. It is already the most popular Pascal on the Commodore 64, and will soon be released for the Spectrum and the Amstrad. In fact, Oxford Pascal will soon be available for 90% of the computers installed in the U.K., and is already available in German, French, Swedish, and American versions. **Students and teachers alike find that it makes sense to use a standard implementation of Pascal across the whole range of educational micros.** Call us for details of our generous educational discounts.

Manual

Both these compilers come with a manual which has been carefully designed, not only as a quick reference guide, but also as a full tutorial for those new to Pascal.

Resident and Disc Compiler

Oxford Pascal comes in two forms:

For Tape Users...Oxford Resident Pascal. A compiler located largely in ROM which is available at any time. Programs can be written and compiled on the spot without disc or tape access, and compilation is fast enough to make using the compiler much like using the BASIC interpreter. Thus, learning Pascal is a simple interactive process. Some 15K of memory is available for user programs, the remainder being reserved for compiled object code.

For Disc Users...Oxford Disc Pascal offers all the above PLUS...a full disc compiler which is capable of using the WHOLE memory for Pascal object code. It is supplied with a powerful LINKER, allowing you to break large programming tasks down into separately compilable, easily-manageable files.

Friendly Error Messages

Many compilers produce little more than an error and line number to help correct mistakes in Pascal programs. Oxford Pascal however, gives you one of 49 friendly and informative error messages. Messages which not only indicate the reason for an error, but also print out the line in question with a pointer to the exact position where the error was detected.

Run-time errors are reported using line-numbers from the original source-program, with a full explanation of how the error occurred.

Powerful Editor

With Oxford Pascal there is no need for you to learn how to use a new Editor. Pascal programs can be entered in exactly the same way as BASIC programs, without the need to learn any new commands. When you are used to using Pascal, you will find our extensions to the Standard Editor even more useful. What is more, Oxford Pascal allows you to mix BASIC and Pascal together, in much the same way that you can mix BASIC and assembler. In fact you can, if required, mix all three together...BASIC, Pascal and assembler...in one program.

Stand Alone Code

Unlike other compilers, Oxford Disc Pascal allows you to compile on the BBC and then relocate your program so that it will run on the BBC **and** on the Electron. The relocated program will run without a Pascal **ROM** and can be loaded and run from tape or disc just like any other program.

This means that you can distribute or sell your software freely and without the need for **ROM**s, to run either of the above machines.

Price/availability matrix

	BBC 'B'	ELECTRON	C64	SPECTRUM
DISC	£49.95	Not yet!	£49.95	Available April 1st 1985
CASSETTE	£39.95	£59.95 Inc. Cartridge	£22.95	

All prices are inclusive of VAT
Please add £2.00 for postage and packing

Oxford Compilers — The Future

During the next year, we at Oxford will be releasing a series of language implementations such as C, and Modular 2, for the BBC, and other popular micros.

These compilers are being built, using the most modern techniques in **automated** compiler construction, and will bring to the micro-user, a level of robustness and efficiency, only now becoming available to mini and mainframe users.

Oxford...
the Compiler Compilers.

Oxford Pascal Order form. Please make cheques payable to OCSS Ltd.
Please rush me my copy of Oxford Pascal. I enclose £ ______ including £2 postage and packing
My computer is BBC 'B' ☐ ELECTRON ☐ C64 ☐ (Please tick as appropriate)
I would like my compiler supplied on DISC ☐ CASSETTE ☐
Name
Address
Postcode
Telephone

A CHOICE OF 3 DATA BASES!

FROM BEL TECH

**ALL FILES ARE COMPATIBLE
WITH BEL CHARTS, BEL PLOT and BEL GRAPH**

**ALL MENU DRIVEN AND EASY TO USE,
YET POWERFUL ! !**

Mailshot

Use mainly for Names, Addresses etc. although up to 20 Fields are available with 480 characters/record and 600 Records/File or 90K characters on Random Access Disc Version. (14K Characters/File on Tape).

Default Values can be set (alpha or numeric) and amended and the Names and Types of each Field can be changed.

Selective and Global Editing of both Fields and Records with a search for any string/character on any Field.

There are both Find/Display and Browse options with the facility to print individual Records. Any Record can be Deleted/Replaced.

Disc Drives can be selected (0 to 3).

Sorts (Ascending/Descending) can be conducted on any Field as can Searches (<, >, < >, =, >=, <=) whether the Fields are printed/displayed or not.

Printer Control Codes can be sent.

Print up to 8 Fields Across or Down.

Label Printing (std., non-std, 1, 2, 3 across).

Bel Base

All of the facilities above PLUS:

Calculation Options. – Calculate the value of a Field from others – enter Functions etc. Specify decimal places.

Format your own Report with as many Fields as can be fitted into print width (max. 137 characters). Numeric Fields can be summed.

Print Formats can be saved for future use with new data.

Bel Base 2 (Disc Only)

The NEW Super Database Manager with EXTENSIVE FACILITIES

All of the facilities above PLUS:

Configuration Option allows easy selection of Disc Drives, File Names, Sort Fields etc.

Record size increased to 1200 characters and up to 2400 Records/File! Extension Files can take File beyond capacity of one side of Disc!

Minimum keystrokes are needed and extensive use is made of Function Keys.

Re-Calculate Option as per spreadsheet.

Mail Merge, Creation of Sub-files, Date Fields added to all of BEL BASE facilities.

Sort/Search on up to 3 Fields (change them at any time).

AND, OR, NOT Operators added.

MAILSHOT
by
Bel Tech

BEL TECH Software

Order Form	TAPE		DISC		TOTAL
		QTY		QTY	
BEL BASE	16.00		18.00		
BEL BASE 2	N/A		27.00		
BEL CHARTS	16.00		17.00		
BEL CHEM Chemistry 1	9.50		11.50		
Chemistry 2	9.50		11.50		
BEL GEN Genealogy	15.00		23.00		
BEL GRAPH	25.00		27.00		
BEL PLOT	16.00		17.00		
BEL SUBS	14.00		15.00		
MAILSHOT	9.50		11.50		

TOTAL inc. P. & P. £ ______

NAME ______

ADDRESS ______

______

______

COMPUTER TYPE ______ MODEL ______

DISC (if applic.) ______

CREDIT CARD No. PAYMENT BY CHEQUE, P.O., VISA, ACCESS

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Please Complete & Return to:-

BEL TECH Limited, College House,
St. Leonards Close, Bridgnorth,
Shropshire WV16 4EW

Telephone: 07462 5420 (24 Hrs.)

FREEBIE OF THE MONTH

FLEX

Only available with the March tape or disc!

THIS month's free program for all readers who buy The Micro User's monthly tape or disc is Flex. It's an all-action game of skill that's quickly become first choice in our office – when the editor's not here, of course!

Coming second best out of a brief encounter with a malevolent wizard, you find yourself drastically altered.

The wizard's hobby is genetic engineering and your DNA has been changed so you now resemble a carnivorous paramecium – all mouth and little else.

To regain your shape you have to progress through the wizard's DNA storehouse, grabbing as much of your original DNA as you can.

Unfortunately there are 30 different types of DNA you have to acquire, you must avoid consuming its poisonous protectors ... and there's a time limit.

With its combination of arcade action and tactical cunning, Flex is a refreshingly original game that will please even the most discerning games player.

DON'T FORGET!

THREE superb pieces of high quality software now come absolutely free with the monthly tapes and discs from The Micro User.

The December extra is the highly acclaimed Omega Probe – a high speed, all action machine code arcade game that has won rave reviews from the computing press.

The January tape/disc has as its bonus Galactic Tycoon – a game of financial endeavour in the further reaches of space that will intrigue players of all ages.

The February freebie was Atomic Protector – a fast and furious machine code game in which you try to avert impending nuclear disaster.

Omega Probe
GALACTIC TYCOON
Atomic Protector

To order your tape or disc complete the coupon on Page 189

when it comes to upgrading your BBC micro there are two choices
this....
or this....
there's really only one choice -
OAK

Whether you are already an owner or thinking of purchasing your first BBC computer - then the OAK is for you. The OAK offers a versatile unit which can house as much or as little as you require - the beauty being that you can upgrade at any time without having to add-on externally to the OAK unit.

The OAK is available in practically any form, from the basic housing kit (for your existing micro and add-ons) through to the complete ready built unit which, as you can see from the specification, is a pretty sophisticated machine - the mighty OAK.

OAK

ANOTHER UCC QUALITY PRODUCT.

Because of the outward looking design, the BBC Micro Computer has become one of the worlds leading computers. Its popularity is derived from its flexibility as a powerful home computer through to a personal computer widely used in science, education, commerce and industry. This flexibility has been enhanced by the vast range of add-ons that have become available - unfortunately these in themselves have created the micro's major weakness - in many cases they are self-contained units whose cases and cables require a lot of extra space in order to site the computer. This detracts from the overall value of the system.
The OAK computer range overcomes these problems as the vast majority of add-ons are capable of being housed within its own casing.
The OAK has been specially developed to be the most versatile computer system in its field.

The OAK computer
BASIC RANGE.

Model 1.
Processor case
Detachable keyboard case .... £ 110.00

Model 2.
Processor case
Detachable keyboard case
Plugs, sockets and cables .... £ 149.00

Model 3.
Processor case
Detachable keyboard case
Plugs, sockets and cables
BBC Model B motherboard
BBC Model B keyboard
35 watt power supply unit .... £ 525.00

Model 4.
Processor case
Detachable keyboard case
Plugs, sockets and cables
BBC Model B keyboard
BBC Model B motherboard
Disc interface
2 x 250K disc drives
35 watt power supply unit .... £ 849.00

Model 5.
Processor case
Detachable keyboard case
BBC Model B keyboard
BBC Model B motherboard
Disc interface
2 x 1 mb disc drives
85 watt power supply unit £1095.00

Model 6.
Processor case
Detachable keyboard case
BBC Model B keyboard
BBC Model B motherboard
Disc interface
2 x 1 mb disc drives
6502 2nd processor
85 watt power supply unit £1295.00

Model 7.
Processor case
Detachable keyboard case
BBC Model B keyboard
BBC Model B motherboard
Disc interface
2 x 1 mb disc drives
Z80A 2nd processor
85 watt power supply unit £1495.00

ALL OTHER SPECIFICATIONS ARE AVAILABLE - SEE ORDER FORM

All prices shown above are exclusive of VAT and delivery.

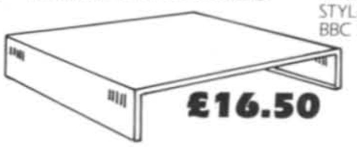
UNIVERSAL
COMMUNICATIONS
COMPANY
Unit 17/18,
Bowling Court Industrial Estate
Bowling Back Lane,
Bradford BD4 8TF
CALLERS WELCOME
TEL: BRADFORD (0274) 390114

UCC

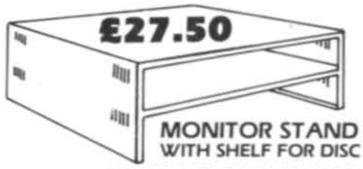
TURN THE PAGE FOR MORE UCC PRODUCTS AND ORDER FORM

MACRO SAVINGS FOR MICRO USERS

MONITOR STANDS



£16.50

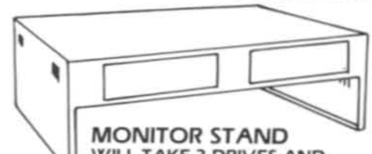


£27.50

MONITOR STAND
WITH SHELF FOR DISC DRIVES
STYLED AND COLOUR MATCHED TO BBC STRONG METAL CONSTRUCTION

MONITOR STAND
STYLED AND COLOUR MATCHED TO BBC STRONG METAL CONSTRUCTION

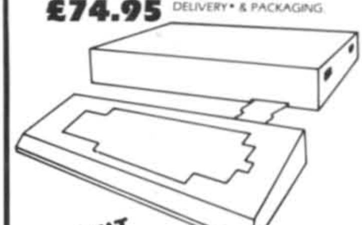
£55.00



MONITOR STAND
WILL TAKE 2 DRIVES AND POWER SUPPLY
STYLED AND COLOUR MATCHED TO BBC
STRONG METAL CONSTRUCTION

PRICES INCLUDE VAT, DELIVERY • & PACKAGING

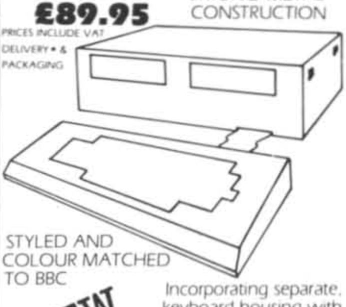
BBC COMPUTER CASE
UCC 500C
£74.95
PRICE INCLUDES VAT, DELIVERY • & PACKAGING



NEW

STYLED AND COLOUR MATCHED TO BBC
STRONG METAL CONSTRUCTION.
Incorporating separate keyboard housing with connecting ribbon cable, and computer housing that functions as a monitor stand.

BBC COMPUTER CASE
UCC 600C
£89.95
PRICES INCLUDE VAT DELIVERY • & PACKAGING
STRONG METAL CONSTRUCTION



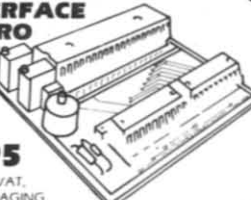
STYLED AND COLOUR MATCHED TO BBC

NEW

Incorporating separate, keyboard housing with connecting ribbon cable, computer housing which can accommodate up to 2 half height disc drives and a separate power supply unit. The computer casing also functions as a monitor stand.

UDM DOUBLE DENSITY DISC INTERFACE FOR BBC MICRO

- Supports single and double density
- Supports 40 or 80 tracks
- ACORN compatible. Runs ELITE, CLARES REPLICA II, MINI OFFICE, BASIC, FORTH BCLP, VIEW, WORDWISE, GEMINI etc.
- Supports single and double sided discs
- Firmware Format and Verify
- Complete with 80 page manual
- Simple to fit



£104.95
PRICES INCLUDE VAT, DELIVERY • & PACKAGING

CONTROL DATA FLOPPY DISKS

SS/DD 48 TPI Per Pack of 10...£16.40	DS/DD 48 TPI Per Pack of 10...£20.50
SS/DD 96 TPI Per Pack of 10...£24.00	DS/DD 96 TPI Per Pack of 10...£26.00

All floppy disks carry a minimum 5 year guarantee   PRICES INCLUDE VAT, DELIVERY • & PACKAGING

POWER SUPPLY UNIT STAND ALONE
STRONG METAL CASE
MATCHING BBC COLOUR
Powers up to two disc drives including Dual Disc Drive connecting cable, Mains power load and plug.

£45
PRICES INCLUDE VAT, DELIVERY • & PACKAGING

UNIVERSAL
COMMUNICATIONS
COMPANY
Unit 17/18,
Bowling Court Industrial Estate,
Bowling Back Lane,
Bradford BD4 8TF
CALLERS WELCOME
TEL: BRADFORD (0274) 390114

UCC

TURN THE PAGE FOR MORE UCC PRODUCTS AND ORDER FORM

LCS Leigh Computer Systems

Authorised Acorn Service Centre. ACT and Ferranti Computer Dealer

CUMANA DISC DRIVES FROM £99.95

	Inc VAT £
CSX 100	114.89
CSX 200	153.29
CSX 200D	159.13
CSX 400	182.15
CS 100	153.29
CS 200	185.03
CS 400	210.93
CS 100E	143.80
CS 200E	173.53
CS 400E	200.38
CS 200ED	185.03
CD 200	273.26
CD 400D	366.28
CD 400/S	345.00
CD 800/S	396.75

Note: CSX drives do not have power supply.

DFS KIT	105.00

MONITORS

	Inc VAT £
PHILIPS 20MH GREEN	89.00
PHILIPS 20MH AMBER	95.00
PHILIPS IBM PC GREEN	105.00
DIGIVISION COLOUR (Special)	169.00
MICROVITEC 1431	198.00
MICROVITEC 1451	248.00
MICROVITEC 1441	398.00
MICROVITEC QL	275.00
SABA TV MONITOR (Special)	199.00
SABA TV MONITOR Remote	219.00

KAGA, SANYO, IBM + ACT MONITORS AVAILABLE

PRINTERS

	Inc VAT £
DOT MATRIX	
CANON PW1080A	298.00
CANON PW1156A	388.00
KAGA KP810	279.00
KAGA KP910	379.00
EPSON RX80	218.50
EPSON RX80 F/T	245.00
EPSON FX80	373.00
EPSON MX100	420.00
EPSON FX100	487.50
EPSON JX80	516.00
EPSON LQ1500	1019.00
MANNESMAN TALLY MT80	189.00
MANNESMAN TALLY MT180	665.00
STAR GEMINI 10X	218.00
STAR GEMINI 15X	324.00
EPSON SERIAL INTERFACE (8143)	41.00
EPSON SERIAL INTERFACE (8148)	64.00
PAPER (2000 sheets)	12.00
DAISYWHEEL	
BROTHER HR15	375.00
BROTHER KEYBOARD	150.00
QUEN DATA	219.00
JUKI 6100	339.00

RANGE OF RIBBONS FOR ALL PRINTERS

ROMS

	Inc VAT £
WORDWISE	36.80
VIEW	59.95
GRAPHICS ROM	31.00
DISC DOCTOR	31.00
GEMLIN	31.00
PRINT MASTER	31.00
CARETAKER	31.00
COMMUNICATOR	31.00
BEBUGSOFT – IN STOCK	65.00
2764 EPROMS	5.57
27128 EPROMS	17.25

PERIPHERALS

	Inc VAT £
HCR PROGRAMMER	57.00
HCR 16K RAM BOARD with write protect (plugs into ROM socket)	36.80
EXTRA RAM	23.00
PAIR OF LVL JOYSTICKS	19.95
PRO-LINK INTERFACE	9.95
C12 BLANK TAPES	40
SPECTRUM INTERFACE II	19.95
TEAK MONITOR STAND	10.35
AMX Mouse	79.00

COMPUTERS

	Inc VAT £
ACORN ELECTRON	199.00
BBC B	399.00
BBC B + DFS	469.00
SANYO 555	955.00
ADVANCE 128K	1248.90
ADVANCE 256K	1329.40

ACT MACHINES AVAILABLE ie. F1 APRICOT

ACT BUSINESS MACHINES SUPPLIED

EDUCATIONAL ORDERS SUPPLIED

– Price list available on application

P & P
80p small items
£7 large items

75 CROSS STREET
SALE
MANCHESTER
Telephone: 061-905 2144

7 COVENTRY ROAD
HINCKLEY
LEICS.
Telephone: 0455 612139

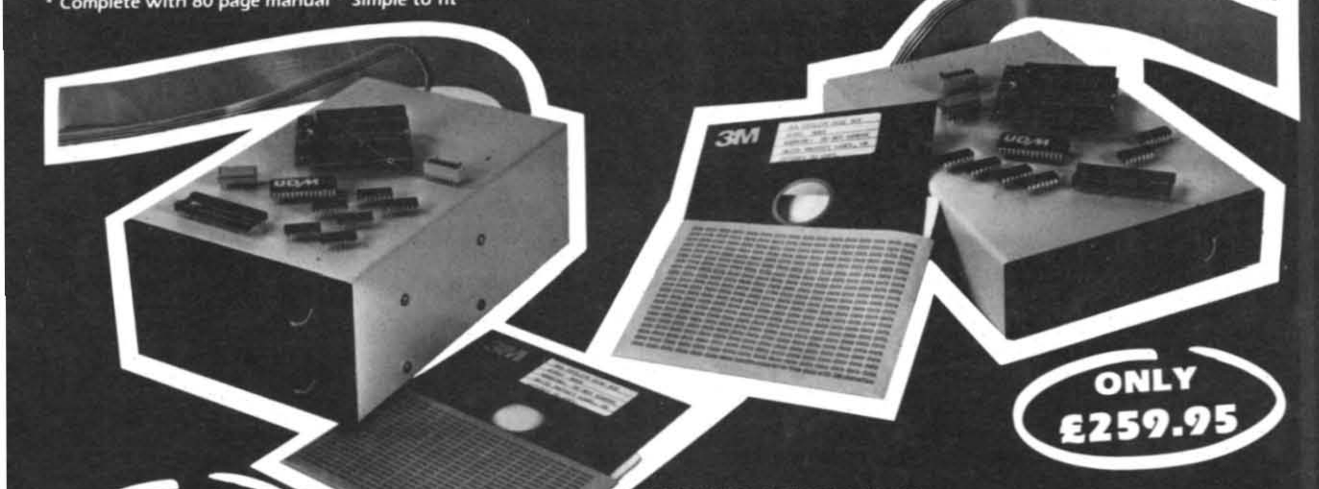
ALL PRICES INCLUDE VAT

TEAC 55F 40/80
SWITCHABLE DISC DRIVES WITH **UDM** DISC INTERFACE

TEAC'S advanced technical features and reliability are the main reasons for TEAC being the most popular disc drives for use with the BBC computer. UDM disc interface comes complete. You require no extra chips. It incorporates the following features: * Supports single and double density * Supports 40 or 80 tracks * ACORN compatible. Runs ELITE, CLARES REPLICA II, MINI OFFICE, BASIC, FORTH BCLP, VIEW, WORDWISE, GEMINI etc. * Supports single and double sided discs * Firmware Format and Verify * Complete with 80 page manual * Simple to fit

SPECIAL
TEAC 55F 40/80 800K
SWITCHABLE DISC DRIVE
ONLY £169.95

TEAC 55F 40/80 TRACK SWITCHABLE DISC DRIVE COMPLETE WITH UDM DISC INTERFACE



ONLY £259.95

ONLY £429.95

TEAC 55F 40/80 TRACK SWITCHABLE DUAL DISC DRIVE COMPLETE WITH UDM INTERFACE

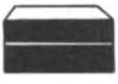
ALL PRICES ARE CORRECT AT TIME OF GOING TO PRESS AND ALL OFFERS ARE SUBJECT TO AVAILABILITY

DISC DRIVES:
TEAC 55F 40/80 TRACK SWITCHABLE DISC DRIVES
LOW POWER HALF HEIGHT DISC DRIVE UNITS
800K

Disc Drive Units including special offers come complete with:-
- All metal cases colour matched to BBC
- Ribbon cable to connect to BBC micro
- Power cable to connect to BBC micro
- Power cable to mains where PSU is fitted
- Manual/formating disc
- Full 12 months warranty
- Price includes VAT, postage.

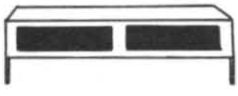
STYLE A
UCL 4080C £169.95

STYLE B
UCL 4080D £338.95



STYLE C
UCL 4080DS £338.95

STYLE D
UCL 4080DB £375.95



STYLE E
UCL 4080BB £393.95

INTEGRAL POWER SUPPLY EXTRA £32.50

PRICE INCLUDES VAT, DELIVERY* & PACKAGING.

ALL TEAC 55 SLIMLINE DRIVES AVAILABLE — RING 0274 390114 FOR PRICES

MONITORS, PRINTERS, CABLES ALSO AVAILABLE
PLEASE PHONE FOR DETAILS OR SEE ORDER FORM

UNIVERSAL COMMUNICATIONS COMPANY - BRITAIN'S FASTEST GROWING COMPUTER PERIPHERALS HOUSE.
SALES POLICY: WE SELL THE HIGHEST QUALITY PRODUCTS AT THE LOWEST POSSIBLE PRICES.

ORDER FORM — FILL IN THE ORDER FORM AND SEND IT WITH REMITTANCE TO:-
Universal Communications Company, FREEPOST, Unit 17/18 Bowling Court Industrial Estate, Bowling Back Lane, Bradford BD4 6BR

This order form can also be used for the OAK range

Only the OAK range prices are exclusive of VAT & delivery - if using this order form for the OAK please add VAT at 15% and £8 delivery to the listed price. All other UCC prices include VAT and delivery *

For more information about the OAK range ☐ or our full range ☐ please tick appropriate box and we will forward more details by return of post.

PLEASE SUPPLY THE FOLLOWING

ITEM	QTY	PRICE	TOTAL
		TOTAL PAYABLE	

PLEASE ALLOW 14 DAYS FOR DELIVERY
*DELIVERY TO ANY ADDRESS IN U.K.

NAME ....
ADDRESS ....
.... POSTCODE ....
TEL. NO ....
I enclose a cheque/PO for a total of £ ....
made payable to U.C.C.
Signed ....

IMPORTANT - WITH THE EXCEPTION OF THE OAK RANGE ALL UCC PRICES ARE INCLUSIVE OF VAT, DELIVERY AND PACKING

WE WELCOME EDUCATIONAL AND LOCAL AUTHORITY ENQUIRIES.

SATAN'S CHALLENGE

or (Nevil Rides Out) A Black Magic Adventure

Dare you take up the challenge laid down by the most evil and sinister of all beings . . . the devil himself.

If you do you will find yourself alone and at the mercy of the twisted fancies and whims of a cold and calculating mind.

Occult forces are threatening the lives of those near and dear to you. Their only salvation rests in your hands but in accepting the challenge your own existence is put in severe peril.

In taking up the challenge you have to find the TALISMAN and locate a pentagram which then has to be prepared for the final rite. In the mean time dark forces will be opposing you making a difficult task almost impossible.

Do not allow yourself to the lulled into a sense of security for it will be short lived.

Many have gone before only to swell the ranks of the damned.

This is the latest adventure from the stables of Microtest and has been written with the acclaimed features of other adventures in mind eg save facility, quick response, simple but extensive commands, a mixture of logical and fiendish problems to solve.

Be warned this is an easy adventure to get into but devilishly difficult to end.

*CASSETTE **£7.95** inc VAT*

*DISC 40 or 80 tk **£9.45** inc VAT (add 50p p&p)*

DAIRYFILE FOR DAIRY FARMERS

Keep on that economic line between over and under feeding!

Save time recording milk yield and calculating feed amounts!

Quickly decide feeding policy with the 'Monthly Calving Group' Performance Graph!

Print out a recording sheet with cows in numerical order. Print out graphs or tables of individual cows or Monthly Groups showing serving and pregnancy details, illness record, Calving Index, weekly and running total Margin over Concentrate. See at a glance cows due for serving, pregnancy diagnosis and drying off. Keep track of weekly total feed cost and milk sale price.

All this and more with DAIRYFILE.

Predict cow or Monthly Group total lactation yield. Compare with Standard Lactation Curves. All old data preserved – compare Monthly Groups over the years. Which is the most profitable month?

Find out with DAIRYFILE – for up to 200 lactating cows.

Available on dual 40 tk disc (For dual 40 tk drives only)

Dual or Single 80 tk drives **£69** inc VAT (add 50p p&p)

Please state on ordering which disc format and printer model.

MICROTEST FONT ROM

This exciting new ROM from Microtest will enable you to get all sorts of new characters and fonts from your BBC Computer. Once you have produced your masterpiece on the screen, all you have to do is use the inbuilt screen-dump utility to produce a hard copy onto paper.

Typing '*HELP FONTS' gives a list of available fonts and the blocks of characters which they replace.

Available fonts are:

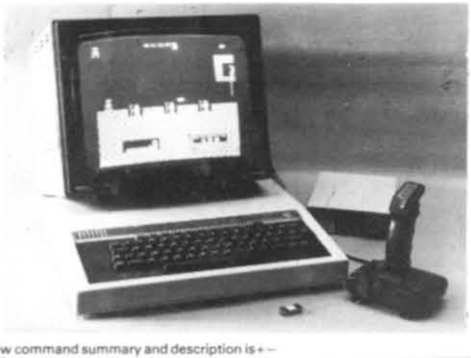
***Accents**	Accents and miscellaneous.
***Block**	Small capitals.
***Data**	Like the bottoms of cheques.
***Greek**	It's all Greek to me too!
***Joined**	Standard capitals with joined up lower case.
***Maths**	A mix of until now unobtainable Mathematical symbols.
***Miscellaneous**	A few oddities which often are very necessary.
***Thick**	Thick text (for MODEs 0&3) to enhance 80 column mode.
***Thin**	Thin text (for MODEs 2&5) which makes modes 2 & 5 much more readable or perhaps "READABLE".
***MODE 8**	Ten column multicolour, memory-miserly mode.
***Vertical**	For labelling graphs.
***S DUMP**	A dump facility which will produce a screen dump of any MODE from 0 to 8 (including a text only dump in MODE 7) on an Epson, Star, CTI CP80 or MT80.

The ROM uses absolutely NO user memory and can be used with word processors etc. as well as normal BASIC programs. The DUMP utility will produce positive or negative graphics and will also rotate the picture produced through 90° as well as being able to position the picture anywhere laterally across the sheet of paper.

***£17.50** inc VAT (add 50p p&p)*

New Issue Microtest Starstick & Joystick Package.

announcing the arrival of the new issue 2+ ROM.



Available now the NEW issue 2+ ROM Joystick comes in three forms:

OPTION 1 The Starstick ROM and Quiskshot I Joystick
Price £22.85 + £1.00 P&P.

OPTION 2 The Starstick ROM and Quickshot II Joystick
Price £25.50 + £1.00 P&P.

OPTION 3 The Starstick ROM and Patch Lead (choose your own Atari/Spectrum style joystick
Price £20.50 + £1.00 P&P.

OPTION 4 Send your old version STARSTICK ROM back to us for reprogramming to issue 2+
Price £3.50 + £0.50 P&P.

VI.4 STARSTICK was 4K the new version has been squashed into 8K.

The NEW ISSUE ROM is compatible with latest* ACORNSOFT programs as well as REPLICA II.

As with the VI41 issue of ROM you can at last connect good "self centring", "rapid action" joysticks to the BBC Computer via the user port. (Model A owners please note that you do not need the analogue interface fitted to your computer but you will need the user port and IC76).

Pressing any combination of the BREAK key does not effect the STARSTICK software and now by pressing TAB-BREAK REPLICA II is auto booted and is compatible with the STARSTICK ROM V2+.

The software patch provided in the ROM monitors O.S. calls and patches the Joystick to the Games programs, and so will work with most games programs even programs not meant to function with Joysticks (except those using illegal direct memory addressing).

The new command summary and description is+ –

*STICK	enables the ROM.
*NSTICK	dissables the ROM.
*SETSTICK	program joystick.
*KSAVE	save protocols set by *SETSTICK.
*KLOAD	load protocols saved by *KSAVE.
*MAP	remap current keyboard definitions. play games using your favourite keys.
*CLEVER	intelligent loading of software (ensuring ACORN compatibility).
*PLONK	relocate area of work memory used.
*PROP1	proportional joystick emmulator 1.
*PROP2	proportional joystick emmulator 2.
*ANA	patches joysticks via the analogue port to games.
*KILL	ROM manager, dissables troublesome ROMs.
*DOUBLE	replace up to two joysticks.
TAB-BREAK	Auto boots REPLICA II.
*PAUSE	define key to freeze game.
*NPAUSE	dissable *PAUSE.
*NAME	predefined key protocols.
*HELP KEYS	display current key protocols.
*REPEAT	enables ROM based auto repeat.
*NREPEAT	dissables *REPEAT.

Should a contention state occur when two roms or more try to use the same *command prefixing any of the above with M will help solve the problem.

available from

MICROTEST LTD

18 Normandy Way, Bodmin, Cornwall PL31 1EX

Telephone: 0208 3812
OR ANY GOOD DEALER

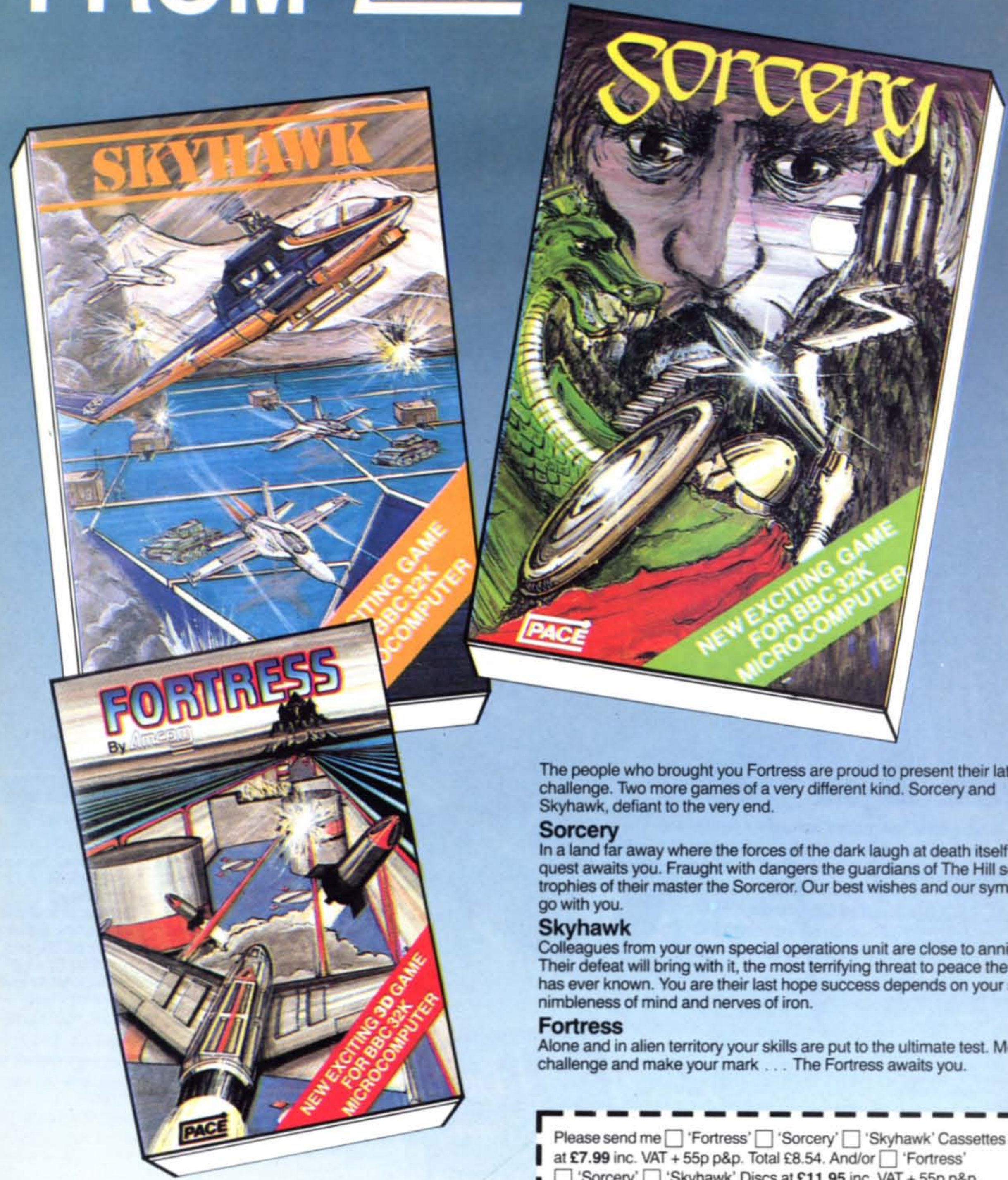
DEALER ENQUIRIES
and
EXPORT ORDERS
WELCOME

Search for the free prizes hidden within the pages of our **MICROBASE BULLETIN BOARD** – in service 24 hours a day on **0208 77677** – use standard PRESTEL software and baud rates.

Large picture shows BBC Computer System and a Quickshot II Joystick. Small inset just a few of the joysticks that will work with the patch lead. Screenshot by kind permission of SUPERIOR SOFTWARE

All MICROTEST ROMs are fully TUBE® compatible. (TUBE® is a reg. trademark of Acorn Computers).

THREE OF A KIND. . .
FROM PACE


SKYHAWK
CITING GAME
BBC 32K
OCOMPUTER
Sorcery
PACE
NEW EXCITING GAME
FOR BBC 32K
MICROCOMPUTER
FORTRESS
By Amcom
NEW EXCITING 3D GAME
FOR BBC 32K
MICROCOMPUTER
PACE

The people who brought you Fortress are proud to present their latest challenge. Two more games of a very different kind. Sorcery and Skyhawk, defiant to the very end.

Sorcery
In a land far away where the forces of the dark laugh at death itself your quest awaits you. Fraught with dangers the guardians of The Hill seek trophies of their master the Sorceror. Our best wishes and our sympathy go with you.

Skyhawk
Colleagues from your own special operations unit are close to annihilation. Their defeat will bring with it, the most terrifying threat to peace the planet has ever known. You are their last hope success depends on your skill, nimbleness of mind and nerves of iron.

Fortress
Alone and in alien territory your skills are put to the ultimate test. Meet the challenge and make your mark . . . The Fortress awaits you.

Please send me ☐ 'Fortress' ☐ 'Sorcery' ☐ 'Skyhawk' Cassettes at **£7.99** inc. VAT + 55p p&p. Total £8.54. And/or ☐ 'Fortress' ☐ 'Sorcery' ☐ 'Skyhawk' Discs at **£11.95** inc. VAT + 55p p&p. Total £11.54. For Sorcery please state ☐ BBC or ☐ Electron

Total remittance enclosed..

Access/Barclaycard..........................Cheque/PO No..........................

Name..

Address..

.... Tel:..

MU3/85

VISA

We welcome Access

Cassettes £7.99 inc. VAT. Disc versions available.
Usable on both 40 and 80 track drives. £10.99 inc. VAT.
Available direct from Pace or from your nearest Micro Dealer.
PACE 92, New Cross Street, Bradford BD5 8BS.
Access/Barclaycard orders. Tel: 0274 729306.

NEW 16k EPROM

***HEX,** Is a full HEX dump, displaying 8 bytes of HEX and ASCII equivalent per line. A status line shows the current address and the byte at this address in:- HEX, ASCII, Decimal and either the binary, basic token or assembler mnemonic. Forward and reverse scrolling of the display at normal and high speeds is a feature, as is a full on screen memory editing facility which allows inputs in either hexadecimal, ASCII characters or assembler mnemonics.

***MON,** Serves the same function as *HEX, but the display is in disassembled opcodes, rather than *HEX. The editing and scrolling facilties are the same as for *HEX. An additional feature of *MON is the ability to directly follow JSR's, branch's etc.

***DEBUG,** A full featured program debugging aid, allowing the programmer to see the most intimate details of the program under examination. Features, variable speed, single stepping, breakpoints, continuously updated disassembler, selective HEX dumps (up to 6) plus current stack, all continuously displayed on screen, plus many other features.

***DISCED,** A comprehensive disc sector editor enabling any sector of a disc to be read, inspected, edited and written back. It will work with any 40, 80 or dual formatted single density disc.

***DGET,** Searches a disc for all occurances of a string or group of bytes.

***REL,** Enables machine code to be easily moved around in memory, automatically adjusting JSR's, JMP's etc.

***SLOW,** This command causes the entire computer to slow down to any variable speed between 1 and 255. This can allow the in depth study of graphic's methods etc.

***EDIT,** A dynamic basic screen editor, cursor controlled with full forward/reverse scrolling of listing, incorporating insert/delete lines, insert/overwrite characters, enter line from any position after editing.

"No need to Sweat!
Let me be your slave."

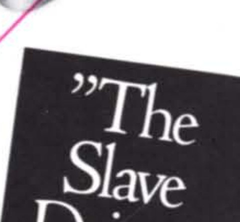
***REF,** Produces a cross-reference listing of the current basic program. All variable names are listed (WITHOUT HAVING TO RUN THE PROGRAM!) in alphabetical order followed by the line numbers on which they are referenced. Numeric items can also be crossed referenced if desired.

***SORT,** A built in sort routine allowing any single dimension array, be it integer, real or string, to be sorted.

BASIC COMMAND LIST:-
*PROG, *BAD, *EXTEND, *PACK, *SORT, *PAGE, *ENVELOPE, *FIND, *REPLACE, *XREF, *TRON, *TROFF, *CHAR, *EDIT, *EDKEY.

MACHINE CODE COMMAND LIST:-
*MCODE, *MOVE, *CROM, *SLOW, *GET, *PHEX, *GO, *MON, *HEX, *SPACE, *DGET, *DISCED, *DIS, *DEBUG, *CRC, *REL.

Designed with the serious programmer in mind, a 16K Eprom packed with a multitude of programmer friendly utilities, as with all SLAVE'S, SLAVE is instantly available and will obey an extensive range of commands. So why not invest in more muscle for your BEEB, and get some help with the heavy work!!! SLAVE has over 30 comprehensive machine code and basic tools.


"The Slave Drivers Guide."

Slave is available direct from A&F Software Ltd for only £49.95. This includes post, packing, VAT, and User Guide.

Please send me a Slave, I enclose my cheque/PO for £49.95.

Cheque N°. ____________ Please debit my Access/Visa N°. ____________

Name ____________

Address ____________

____________ Telephone: ____________

Remittance to:-
A&F Software Ltd.,
Unit 8, Canal Side Ind. Est.,
Woodbine St East,
Rochdale OL16 5LB

Please allow 14 days for delivery.

A&F Software Ltd.,
Unit 8, Canal Side Ind. Est.,
Woodbine St East,
Rochdale OL16 5LB

24 hrs HOTLINE
0706 341111

ANDY HOOD concludes his series on understanding the use of machine code in communications software

It's the last round up for communications programmers

THIS, the last in the series, is something of a pot-pourri of hints, tips and useful machine code routines for the communications programmer on the BBC Micro.

I also hope to answer some of the questions most often asked by users on Microweb – starting with that from tape users who experience difficulty in saving or loading files while on line to other computer systems.

You will remember from my article in the September issue that we looked at the way in which the BBC Micro buffers all input and output in memory until it is ready to process it. The areas we are especially interested in are the RS423 output and input buffers, located at memory addresses &900 and &A00 respectively.

The MOS, as usual, provides us with a full range of OSBYTE (or FX) calls with which to check and manipulate these buffers so that we need not be concerned too much with their absolute location in memory.

You might, in fact, wonder why I mention it at all. Well space is a precious commodity in memory and in order to make the most of it the MOS uses the areas at &900 and &A00 for a multitude of purposes. Figure I shows the alternative uses to which they may be put.

As you can see, the main conflict arises in the use of these areas for both the RS423 and cassette filing systems. Any direct clash is avoided as the MOS only supports the operation of system at any one time.

Problems can then arise with terminal software that attempts to SPOOL data to or from the cassette while it is communicating. A further complication is that the same chip controls both the cassette and RS423 operations.

This chip, the 6850, is responsible for keeping certain signals to the modem going during communications. When it is asked to change its operation to cassette mode to load or save a file it is unable to maintain those signals, and the modem thinks it has been disconnected and promptly drops the line.

The early Nightingales, and several other modems, will behave this way if the tape system is used to save or load a file while on-line. The only cure is to modify the modem or its connecting lead so that no matter what happens at the computer end the modem still thinks it is receiving the correct signals.

So much for possible pitfalls of tape based communication systems, now on to the nitty gritty of how to use the RS423 serial port on the BBC Micro.

When you first switch on, the operating system sets certain default values for the serial port. The baud rates for both receive and transmit are set to 9600 and the word format to eight character bits, one stop bit and no parity.

Page 424 of the User Guide lists all possible values for baud speeds from 75 to 19200, and the appropriate FX (or OSBYTE) calls numbers 7 and 8 with which to set the speed. So lets change the baud speed to 300 transmit and receive.

In Basic:

```
*FX7,3 : receive speed = 300 baud.
*FX8,3 : transmit speed = 1200 baud.
```

and in assembler:

```
OSBYTE=&FFF4 : address to call
LDA #07      : OSBYTE no. for receive
LDX #03      : parameter
LDY #00
JSR OSBYTE   : call MOS
```

and similarly with A=8 for transmit speed.

You will remember from the November issue that we looked at how OSBYTE 156 could be used to change the format in which characters were sent or received by changing certain bits in the RS423 control register.

As we saw, only three of the eight possible bits were used to control word

Memory useage &900-&9FF

&900-&9BF	RS423 output buffer.
&900-&9FF	Cassette output buffer.
&900-&9BF	Envelope storage area (envelopes 5-16).
&9C0-&9FF	Speech buffer.

Memory useage &A00-&AFF

&A00-&AFF	RS423 input buffer.
&A00-&AFF	Cassette input buffer.

Figure I

→

Gemini *Serious Software*

BBC MICRO

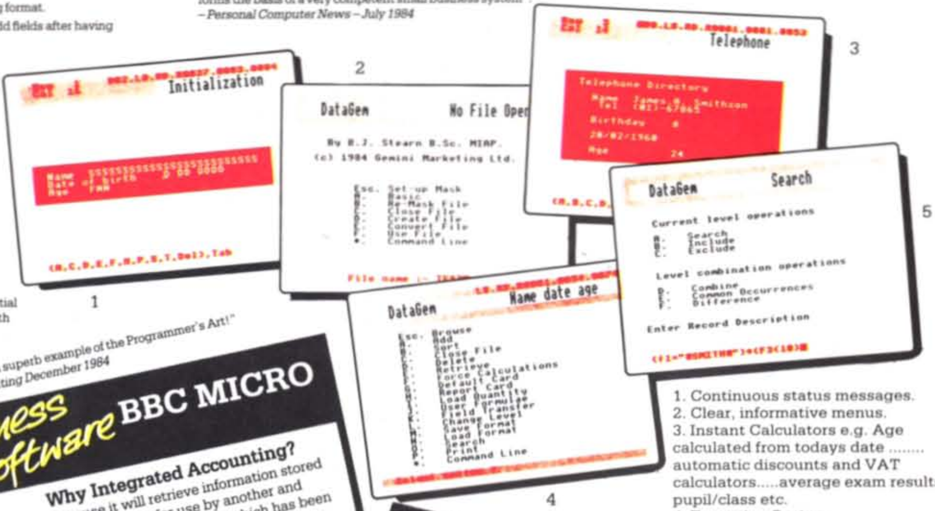
DATA *Gem*

R.0101

£129.95

24K ROM Based Database Management System for the BBC Micro

- 24K ROM Based Random Access Database with 184 page manual.
- Allows searches on any field or COMBINATION of fields to ANY depth.
- Up to 9 subsets of data INSTANTLY available and saved to disk automatically.
- Sorts alphabetical or Numeric on any field, ascending or descending with NO LIMIT on the depth of sort.
- Interfaces with 'VIEW' and 'WORDWISE'.
- Includes a completely flexible printing format.
- Allows the user to extend the file or add fields after having started to enter data.
- Allows up to 5100 User Definable Records with up to 62 fields per record and a maximum file size of 10 Megabytes.
- Permits just ONE file to exist over FOUR floppy disk drive surfaces.
- Offers a free format painted screen which scrolls 120 x 120, and supports extensive mathematics.
- Provides User defined field relational variables and multiple and single character wildcards.
- Exists self contained on ROM, and does not require additional utilities on disk.
- Finds the occurrence of a string or partial string in ANY field in the database with just one command.
- Price includes 40/80 Track Applications Demonstration Disk
- DFS Compatability includes:-Acorn 0.9; Acorn 1.2 DNFS; Amcom B; Opus DDOS 3.12, 3.13,3.14; Watford 1.0, 1.2, 1.4, DDFS; LVL DDOS; Acorn Winchester; S.J. Systems Econet/ Winchester (To Order). All other DFS'S conforming to Acorn System Protocol
- Press Comments:-
- "Datagem provides many of the spreadsheet facilities of an item like Lotus 1-2-3....... Combined with a word-processor it forms the basis of a very competent small business system". *– Personal Computer News – July 1984*
- "Datagem stands out in terms of both price and performance". *–Acorn User – December 1984.*
- "As well as its sheer size, Datagem is also very well enclosed with features which make the setting up, searching and outputting from a datafile easy and flexible". *– A & B Computing – December 1984*


Initialization
Name
Date of birth
Age
1
DataGem
No File Open
By R.J. Stearn B.Sc. MIAP.
(c) 1984 Gemini Marketing Ltd.
Esc. Set-up Mask
Basic
Re-Mask File
Close File
Create File
Convert File
Use File
Command Line
File name :-
2
Telephone
Telephone Directory
Name James.R. Smithson
Tel (01)-67865
Birthday
20/02/1960
Age 24
3
DataGem
Name date age
Esc. Browse
Add
Sort
Close File
Delete
Retrieve
Force Calculations
Default Card
Report Card
Load Quantity
User Formulae
Field Transfer
Change Level
Save Format
Load Format
Search
Print
Command Line
4
DataGem
Search
Current level operations
A. Search
B. Include
C. Exclude
Level combination operations
D. Combine
E. Common Occurrences
F. Difference
Enter Record Description
5

1. Continuous status messages.
2. Clear, informative menus.
3. Instant Calculators e.g. Age calculated from todays date .... automatic discounts and VAT calculators.....average exam results pupil/class etc.
4. Extensive Options.
5. Powerful search facilities to update any of the flexible subsets.

"Gemini have produced a superb product..... a superb example of the Programmer's Art!" Integrated Accounting Suite...*A & B Computing December 1984*

Gemini *Business Software* BBC MICRO

INTEGRATED ACCOUNTING

Designed for the small to medium sized business user, where speed and efficiency are vital. Gemini Integrated programs are suitable for sole traders, partnerships or limited companies. All require a BBC B 32K microcomputer, and an 80 column printer. A double disk drive with an Acorn compatible DFS is required for integrated accounting purposes. A single disk drive may be sufficient where modules are used independently, although this is not recommended for the Sales Ledger and Invoicing module. The manuals indicate the system capabilities for various disk drive combinations.

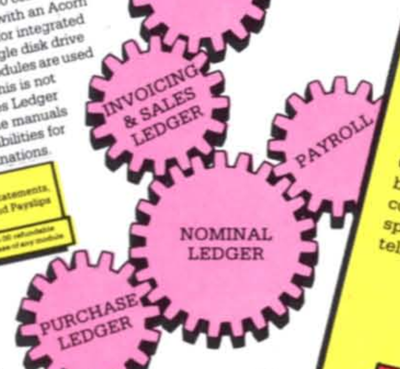
PRE-PRINTED...
Continuous Invoices, Statements, Remittance Advices and Payslips available.

Demo Disk £5.00 refundable on the purchase of any module

Why Integrated Accounting?

Because it will retrieve information stored in one program for use by another and store data in one program which has been generated by another.

NO SECOND PROCESSOR REQUIRED

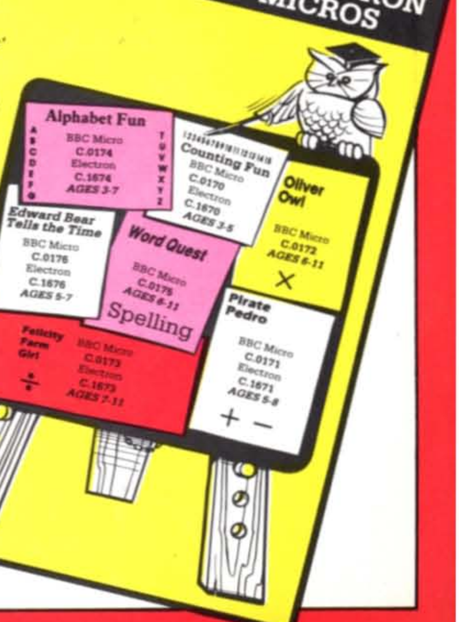

STOCK CONTROL
INVOICING & SALES LEDGER
PAYROLL
NOMINAL LEDGER
PURCHASE LEDGER

£99.95
per module

Gemini *Educational Software* BBC & ELECTRON MICROS

Written in the style of computer games to attract and hold juniors' attentions and enthusiasm. These entertaining and original programs are produced to the same high standards as other top Gemini Software and brilliantly use the computer to teach basic spelling, arithmetic, and telling the time.

£7.95
each


Alphabet Fun
BBC Micro
C.0174
Electron
C.1674
AGES 3-7
Counting Fun
BBC Micro
C.0170
Electron
C.1670
AGES 3-5
Oliver Owl
BBC Micro
C.0172
AGES 6-11
Edward Bear Tells the Time
BBC Micro
C.0176
Electron
C.1676
AGES 5-7
Word Quest
BBC Micro
C.0175
AGES 6-11
Spelling
Felicity Farm Girl
BBC Micro
C.0173
Electron
C.1673
AGES 7-11
Pirate Pedro
BBC Micro
C.0171
Electron
C.1671
AGES 5-8

AVAILABLE FROM:- Most good software dealers... or phone Gemini for prompt despatch quoting your Access, Visa or American Express card number. Telephone (0395) 265165. Alternatively make your cheque or Postal Order payable to **Gemini Marketing Ltd.**, and send to **Gemini Marketing Ltd.,**
18a Littleham Road, Exmouth, Devon EX82QG.

Please send urgently CASSETTE(S)/DISK(S) (please delete)

Prices stated include VAT and Post and Packing (UK only).

Name ....

Address ....

Signature ....

Credit Card No. Access/Visa/ American Express ....

MU

From Page 127

format, so what do the other five do?.

The answer is not a lot as far as the average comms hacker is concerned! They control critical functions of the serial port and are better left alone unless you know exactly what you are doing (brave souls should consult the Advanced User Guide or the 6850 data sheet).

There are, however, one or two cases where we need to use these bits, and I'll confine myself to those.

Several Microweb users have asked how to generate baud rates other than those available for FX7 and FX8, and in particular the 600 rate needed to communicate with some of the small printer/plotters.

Bits 0 and 1 of the control register govern the clock divide ratio which is used in determining baud speed for cassette and RS423 operations. When the system is in RS423 useage this divide (or slowdown) ratio is usually set to 64. Altering the ratio to divide by 16 will then speed up the currently selected baud rate by a factor of four.

If we then set the baud rate to 150 and adjust the clock speed to multiply it by four we will effectively generate the 600 baud required. To achieve this we must set bit 0 and clear bit 1 in the control register.

Remembering that OSBYTE 156 calls take the form

<new value>=(old contents AND Y) EOR X

we need a mask byte in Y of 11111100 or &FC to leave everything but bits 0 and 1 untouched and a value in X of 00000001 or &01 to set bit 0.

The complete switch to 600 baud would then be, in assembly language:

```
OSBYTE=&FFF4
LDA #7
LDX #2 : set transmit speed to 150
LDY #0
JSR OSBYTE
LDA #8
LDX #2 : set receive speed to 150
LDY #0
JSR OSBYTE
LDA #156 : clock divide
LDY #&FC :      #
LDX #1   :      4
JSR OSBYTE
```

The second use for the other five bits in the control register is to produce what is known as a break or space level on the RS423 output.

This is used fairly extensively on large mini and mainframe systems as a means of interrupting the host computer, rather as the Escape key does on the BBC Micro. This system replaces the more common bulletin board method of sending control characters to interrupt, say, a listing of a long file when you have seen all that you require.

To generate this break level on the BBC machine bits 5 and 6 of the control register must be set, again using OSBYTE 156. The Y register mask is then 10011111 and the X register value 01100000.

When this call is executed the old contents of the control register are returned in the X register and must be reinstated after a period of 0.5 seconds – the normal break duration. This can be most easily achieved by using the assembly language equivalent of A=INKEY$(50) (wait 50 hundredths of a second for a key press) after setting the break level.

In assembler the whole routine would be:

```
LDA #156     : execute
LDY #&9F     : break
LDX #&60     : level
JSR OSBYTE : on RS423
TXA
PHA          : save old contents
LDA #129     : same as
LDX #50      : INKEY$(50)
LDY #0
JSR OSBYTE
PLA          : get old contents
TAX          : transfer to X
LDA #156     : and restore
LDY #0       : control
JSR OSBYTE : register
```

Save yourself the trouble of typing your name and address every time you log on

So, after that short break how about a routine to save you the trouble of typing in your name and address every time that you log on to Microweb?

Regular users will know that after logging on to Microweb they are asked to enter their first name, last name and the city from which they are calling. What they may not know is that before asking them for these details Microweb first queries their computer!

It does so by sending a CHR$(5) or ENQuiry to request their terminal to send its log-on string, each word being separated by a ; character, and the complete string being terminated with a carriage return.

To enable our terminal software to respond to this we must check each character being received at the RS423 to see if it is the ENQuiry code 5.

Those using the MicroTerm program published in the September issue of *The Micro User* can add this feature by first setting PAGE to &3000, loading the source code for MicroTerm and then adding the extra line numbers shown in Listing I, remembering to insert your personal log-on string at line 3134. Re-save the amended program and then after running it type:

```
*SAVE MTERMA 1A00 1D00 1A00
```

The program can then be run in exactly the same manner as the original MTERM, but on receipt of the ENQ code it will automatically log you on to Microweb.

```
1   REM AUTO-LOGON FOR MICROTERM
492 CMP #5
494 BNE skip
496 JSR auto_logon
498 .skip
3131 [OPT opt%
3132 .logstring
3133 ]
3134 $P%="ENTER YOUR LOGON HERE"
3135 P%=P%+LEN($P%)+1
3136 [OPT opt%
3137 .auto_logon JSR toRS423
3138 LDY #0:.print_loop LDA
logstring,Y : JSR OSWRCH : INY:
CMP#&D: BNE print_loop: RTS
3139 ]
```

Listing I

Well that's about it. As I said at the beginning, this is the last in the series, but if you have any questions or problems remember Microweb and . . .

COMMUNICATE!

Plug your BBC Micro into the exciting world of telecomputing

TeleLink

– the magazine with all the facts

IT'S your ideal introduction to all the fascinating opportunities that become available to you when you link your BBC Micro to the telephone.

You'll be able to learn all about the many facets of the exciting new world of videotex – about the vast databases held on Prestel and the other public and private viewdata services. About how to use electronic mail and bulletin boards. About how to go teleshopping, and how to download telesoftware into your micro.

TeleLink deliberately steers away from technicalities to present the facts in vivid detail – to help you play your own part in the communications revolution that is going to change all our lives.

Guide to communicating with your micro

Issue No 2 – now on sale – includes a detailed, fact-filled 16-page Guide to Communicating with your Micro.

Subscribe now on the coupon below and SAVE £2 off the normal price

Please send me the first 12 issues of TeleLink at the special introductory price of £10.

☐ Cheque enclosed, payable to Database Publications

☐ I wish to pay by ☐ Visa ☐ Access

Signed ______ No ______

Name ______

Address ______

You can also subscribe via Prestel – key Page *2582011

***POST TO:* TeleLink, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.**

MU3

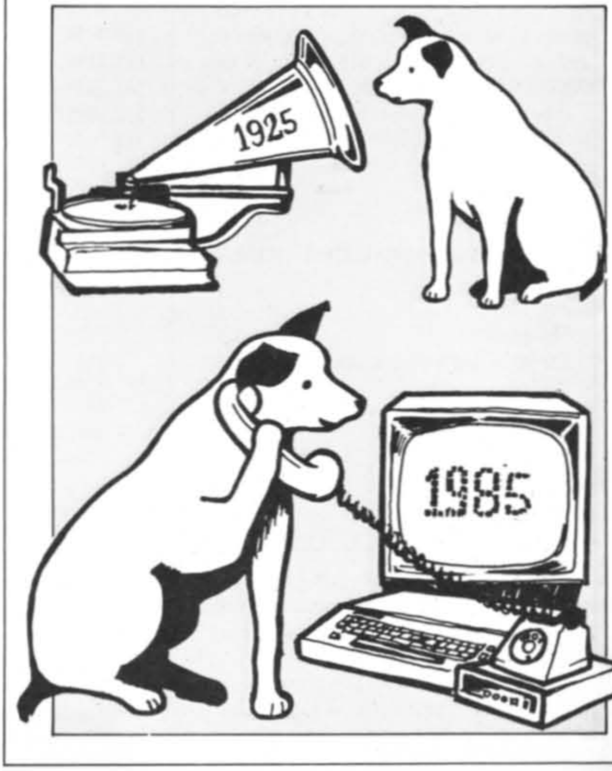
TEACHING OLD DOGS NEW TRICKS

"NETWORKING is the future of computing" we are often told. But is it? Let's examine the immediate future as it affects the chosen few with modems.

I say a chosen few because those fortunate enough to own both a computer and a modem are in on what promises to be an information explosion in the next few years. We are all accustomed to passively looking and listening at the media – TV and radio especially – yet few of us will be able to grasp, let alone use, the ability to respond to such information sources.

Most of you would say that is a pompous statement, but if you stop to think there's a touch of the old adage, "You can't teach an old dog new tricks", in there. So let's look at what, for networkers, will be the norm in a short space of time.

Prestel, British Telecom's viewdata service, is growing up very quickly. Originally, when launched in the late Seventies, it was seen as a method by which home and business users could get information quickly. What is now happening is that users are becoming accustomed to *interactivity* – the watchword of the current comms



explosion.

Prestel has recently launched National Mailbox, which simply means that someone living in say, Manchester, can send electronic mail to someone in John'o'Groats quickly, and more importantly, cheaply (Prestel is usually a local call away).

Projects planned for the future include store and forward mailboxes, personal "one key" directories and interaction with other networks, even other countries.

Since National Mailbox was introduced a few weeks ago the number of mailboxes sent by the 47,000 customers of Prestel has jumped from 70,000 to over 150,000 a month and the figure is rising steadily.

Telecom Gold, BT's premier electronic mail service, far from experiencing a drop in customers as one would expect when customers switch to the much cheaper Prestel, are actually finding a sharp increase in registrations for new customers.

Interactivity is going to be the basis that is going to make or break networks in the next few years. Previously, most network managers would have claimed that Joe Public was quite content to sit back and watch the screen.

But as Prestel has found out – mainly through the activities of Micronet and ClubSpot – there is a terrific drive among people to make their views known, either by actively creating and uploading their own pages or by the use of a facility unique to Prestel (for the time being at least), real time noticeboards.

Services such as Micronet's Chatline and Timeframe International's Bulletin Board have been inundated by users wanting to get their views known.

Micronet's Chatline, even though they make a small charge to cover their own operating costs, still experiences swamping of the system at peak times. This is particularly noticeable, as it slows down the response time from 40 seconds to as high as 15 minutes.

Response time in this case is the time between the sender sending his message and the time when it can be seen by all the users on the network.

So where does all this lead?

Well, I'll stick my neck out and say that in the near future we shall see a massive proliferation of these interactive services, closely followed by a period when the firms slug it out for a saturated audience of mainly home users.

As a result, eventually we will see a few extremely large facilities providing networking services for the majority.

Home telecommuting, as it is called, will be the norm for an increasing minority of fortunate workers who, for work purposes at least, will have slim need to step outside their front door.

Already this is happening in the United States where the effects of such a change in the way we live and work is affecting the fabric of society.

Consider the case of a computer breakdown on a typical middlesize manufacturing plant. While the computer is down, the workers often stand idle. Usually the service engineer, on contract, has to travel from his base sometimes 50 or 60 miles distant. Such a setup can and does cost the company a lot of money in lost time.

The alternative? Either pay the astronomic costs of a fulltime service engineer available round the clock, all day and every day, or allow access to the computer via a modem and a phoneline. It's much cheaper, and more often the only solution to problems which arise during unsocial hours.

Now this is only one isolated example. In the US there are thousands of people who have opted out of the normal office routine. Many find the burden of children and/or disablement makes it impossible to attend an office. The possibility of being able to work while staying at home is regarded as a lifesaver in many situations.

By STEVE GOLD

Back to the UK. Almost certainly, if you have a bank account you'll have used one of those impersonal "hole in the wall" autocash dispensers. The Midland Bank and the Bank of Scotland have pushed the idea forward by allowing banking at home by viewdata services.

Initially the costs of establishing such a network are very high, but the savings to be had are even greater, with no need for expensive High Street premises. The main computer can, and often is, many miles away from the expensive centre of town.

Via Prestel, teleshopping will continue to blossom as families find it more convenient to do their shopping at home rather than traipsing to shops several miles distant.

In the Birmingham area at the moment there is a large scale experiment to see if shopping for groceries via the TV screen is viable. First results seem to indicate it is, and the major shopping chain involved is finding it very profitable.

"How will all this information flow in and out of the home?" I hear you ask.

'Home telecommuting will be the norm for an increasing minority of fortunate workers'

The answer lies in a comms development that BT has been working on in recent years – optical fibres.

Instead of a heavy copper cable carrying only a few conversations on narrow band width channels, the optical fibre links are much lighter and have the ability to carry much more information.

Readers will probably have heard of BT's intention to wire up major suburban houses during the 1990s for cable TV and the like. That cable will become the vital link to the home, carrying several broad band links in and out. Science fiction? Reality for a growing number of families ... NOW!

One thing that information breeds is the thirst for more information, and it is here that, in the short term at least, modem owners will be able to upload their information for the world to read.

Commodore's new CompuNet service, initially available to C64 owners and soon to BBC and Spectrum users too, has an area called The Jungle where subscribers, at their own expense, can upload within reason anything they like – programs, poems, news, views and so on. If they wish, they can charge others to look at it.

In some ways the information explosion has come full circle. In the early days there were bulletin boards where the local hackers posted and read each other's stories. From there we saw the evolution of information utilities such as (in the USA) The Source and (in the UK) Prestel.

Now what we are moving towards is perhaps, the ultimate goal – information for all, by all.

One thing most users may and indeed should be wary of is the big brother syndrome. Since we shall come to rely to a greater and greater extent on these information sources, so the very organisations who carry the information – the information carriers – will be able, should they so wish, to read and, more importantly, alter or suppress the data carried.

Hopefully in Britain today there is little need for such devices to control the public. This will not always be so, so the Government recently passed a Bill, the Data Protection Act, which inhibits firms etc from doing just that.

Let's hope it stays that way, because one day, just like Winston Smith in George Orwell's 1984 novel, we could be in for a surprise.

Modem WS 2000: why it's the experts' choice.

You don't need to be told about the information revolution – you already know that without efficient data communications, you and your business may not survive it.

And you know that a modem will be a vital part of your survival kit.

This is why you should choose Modem WS2000 from Miracle Technology.

POWER
Tx DATA
Rx DATA
CARRIER
ON LINE
1200Rx-75Tx
VIEWTEXT
300/300
75Rx-1200Tx
1200 600
EXTERNAL CONTROL
ON LINE
LOCAL TEST
CCITT
300 FULL DUPLEX
ORIG
ANS
BELL
1200 EQU
1200
ANS
300 FULL
ORIG
1200
1200 EQU
600
V23 TEST
MODE
Modem WS 2000
APPROVED for use with telecommunications systems run by British Telecommunications in accordance with the conditions in the instructions for use

Quality – In concept and construction Miracle Technology sets the standards other modem manufacturers aim for.

Quite simply, WS2000 is one of the best designed, best made modems you can buy.

It is approved for PTT use in the UK and Holland, with approval pending in other European countries.

Flexibility – As a multi-speed, multi-standard modem, WS2000 enables data transfer between almost any two computers – worldwide.

WS2000 gives instant access to the vital information sources of Prestel, Micronet, Telecom Gold and a vast range of public and private databases.

WS2000 can also convert your computer to a telex terminal, giving you inexpensive 2-way international telex facilities.

WS2000 is suitable for use with a wider range of computers than virtually any other modem, and we can offer software packages for most makes.

Versatility – No other modem offers all the facilities available with WS2000.

Its unique versatility means it can be expanded by the addition of autodial and autoanswer options (presently undergoing approval testing with BABT), plus direct computer software control of the modem and much more.

Service – A large dealer/distributor network both in the UK and abroad means you're never far from a WS2000 stockist.

And our Customer Service and Technical Departments are happy to give help and advice.

The Experts – Thousands of users depend on WS2000 – local authorities, government departments, multi-nationals, private companies and individuals.

WS2000 is the modem chosen by the BBC to demonstrate a UK-USA datalink live on TV; selected by Cable & Wireless/Western Union for their Easylink Telex Service; taken round the world on Operation Raleigh; in action for CBS News, sending front-line war reports around the world.

WS2000 is the modem used by people who need reliable data communications today – and every day.

WS2000, with BT telephone lead, mains power supply and comprehensive operating manual costs only **£129.95** exc. (**£154.73** inc. VAT & UK delivery) – you may also need a computer lead (£10.35 inc.) – specify computer when ordering.

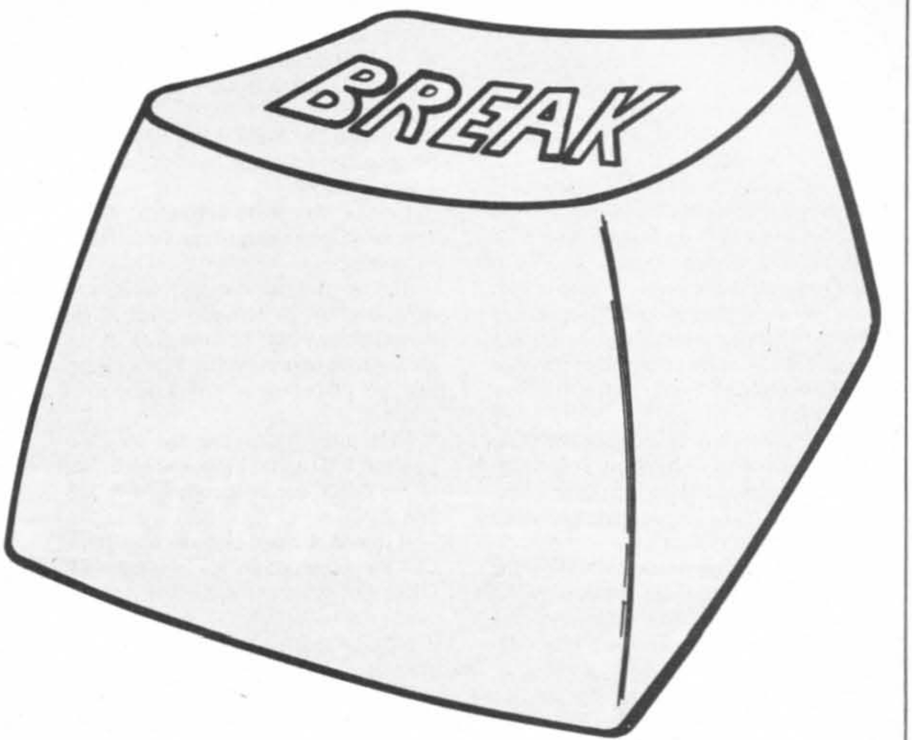
A small price to pay for survival.

Order by cheque/Visa/Access/Trade or official order to:

Miracle Technology (UK) Ltd,
St Peters Street, Ipswich IP1 1XB.
✆ 0473 50304 Tx 946240 CWEASY G 19002985

MIRACLE TECHNOLOGY
we thought of tomorrow, yesterday.

Putting the brakes on your Break key



KEVIN EDWARDS explains how . . .

NUMEROUS letters to *The Micro User* have asked the question: "How can the Break key be disabled?"

The answer is, "with great difficulty!" Totally 'disabling' the Break key is very awkward. This is because Break's effect is controlled by hardware and not software.

Pressing Break causes the input to the reset pin to go low – this pin is on the 6502 Central Processing Unit (CPU). The program counter is then automatically loaded with the contents of locations &FFFC and &FFFD – on OS 1.20 this is &D9CD.

In other words the micro jumps to a machine code routine located at &D9CD.

If you have a machine code monitor, disassemble this routine. You will find one of the most interesting pieces of machine code ever written for the BBC.

This routine performs many operations – far too numerous to mention in this article – some of which cause real problems in trying to undo the Break key's effects.

For instance the variable pointers are cleared and a NEW command is performed. This is mainly done by the Basic ROM.

Now the way round this is to totally disable Break via a hardware modification – a nightmare for the less technically minded. However there are some software techniques frequently advocated.

As you may already know, Break can be programmed by using the *KEY 10 command. Often people use this to OLD and RUN the program in memory.

For example:

```
*KEY10 OLD¦M RUN¦M
```

On pressing Break the program currently in memory will be restored and executed.

The main problem with using this are that variable contents are still lost, and pressing Ctrl+Break clears the effect of the *KEY 10.

In any Break recovery routine the variable contents are almost certainly wanted and for that reason we must find an alternative method.

The only way to stop variables being lost is to terminate the reset routine before it clears the variable pointers. Fortunately, Acorn supplied us with a facility to intercept the Break key's effect.

We do this by writing what's called the Break intercept code, which consists of a three byte machine code instruction. This is done by using *FX commands.

The three bytes should correspond to a 6502 JMP absolute instruction. The OS ignores the Break intercept code if this instruction is not a JMP instruction.

When Break is pressed the first part of the reset routine is executed. This changes the BRK vector at locations &202 and &203 among other things.

The routine I describe here sets it to its previous value, which points into the Basic ROM so as to give an error message when a BRK occurs.

After this the OS checks to see if the first byte of the Break intercept code is a JMP instruction (&4C). If this is the case then the JMP is executed, otherwise it is ignored.

The final two bytes are the low and high byte of the routine which will be "jumped" to.

By using this powerful facility we can execute our own routine instead of the destructive reset routine. The new piece of code puts a GOTO into the keyboard buffer along with a line number.

Once this has been done we re-enter Basic, in immediate mode. The keyboard buffer is then automatically emptied. In effect, the command stored in the buffer is executed.

In this case we GOTO the line given. This will continue the program from the line specified as if nothing has happened. The routine could be classed as an ON BREAK GOTO command.

The three *FX commands which

→

From Page 133

allow the Break intercept code to be programmed are like this:

***FX247,76** 6502 JMP absolute (&4C, 76 in decimal).

***FX248,X** Where X is the low byte of the new routine's location.

***FX249,Y** Where Y is the high byte of the new routine's location.

One interesting point to note is that the Break intercept code is checked twice. The first time is just before the paged ROMs have informed of the reset and the second time is after this has occurred.

When Break is intercepted the filing system defaults to tape at 300 baud. Disc users must allow the Disc Filing System to make its presence known to the operating system.

For this reason we must not allow the new Break handling routine to be executed the first time round – if this happens the disc system will be totally ignored.

The tape baud rate should also be changed to a quicker 1200 – unless 300 is fast enough for you.

Normally tape operations display the file name and the block number of the file currently being loaded or saved. Pressing Break cancels this feature.

To make tape access more friendly we will re-program this option to give the usual messages. A blank screen looks a bit odd, especially when you're trying to find a certain file name.

The next thing to do is find a way of distinguishing between the first and the second call made by the operating system to the new Break handling routine.

We are lucky because the first call is made with the carry flag clear and the second call is made with it set. This means we should only branch to the main body of the new routine if the carry flag is set.

The next thing we must do is write our Break handling routine. This performs the following operations:

- Clear interrupt disable flag – the OS at this point normally has all interrupts disabled. *Line 170.*
- Change the BRK vector – the OS resets this in the first part of its reset routine. This differs in Basic I & II. *Line 180.*
- Disable the Esc key – to stop anyone breaking out of the program. *Line 190.*
- Clear the input buffer – if key 10 has been programmed, its effect will be ignored. *Line 200.*
- Put GOTO XXX into the keyboard buffer – XXX corresponds to the first line to be executed. *Lines 200-220.*
- Re-enter the Basic ROM in immediate mode – again Basic I and II differ. *Line 230.*
- Change the Break intercept code to point to the new Break handling routine. *Lines 270-290.*

Finally we must select the filing system we wish to use. This is either tape or disc.

The new routine has been located at &980, which is normally used as an extended envelope storage area or for the cassette output buffer. This location can be changed to any convenient address.

Remember to change the program counter, P%, and the low and high byte of the Break intercept code – *FX 248 and 249.

It should be noted that pressing Break has the same effect as ON ERROR OFF. For this reason the line number

line which contains a new ON ERROR statement.

If the ON ERROR is not re-defined, and an error occurs, the program will terminate – because the error is no longer trapped.

Fatal errors also have an ON ERROR OFF effect. They include the errors *No room, Bad Program* and *LINE space.* The ON ERROR command cannot trap a fatal error. This means that a fatal error, such as *No room,* will cause the program currently being executed to stop.

Another point to note is that some sideways ROMs can stop the break key trapping routine from working.

Make sure that any lines executed after Break is pressed do not re-dimension arrays. This is because you are not allowed to re-dimension an array which already exists.

If this is done an infinite loop may occur – depending on your error trapping routine.

There are two main listings, one for Basic I and the other for Basic II. In both cases the string in line 240 contains the command which is put in the keyboard buffer.

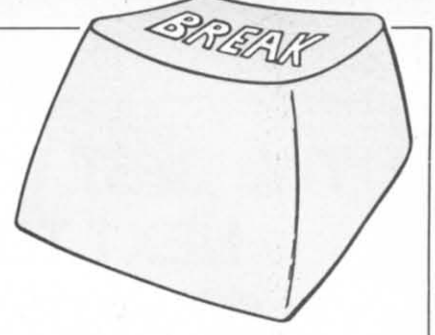
If the routine is included in one of your programs check that the line number following the GOTO is correct. If a non-existent line number is specified, the Beeb will hang up. This will be un-recoverable. The lines given in

```
  100 REM For Basic I only
  110 REM By Kevin Edwards
  120 REM (c) The Micro User
  130 FOR pass=0TO3 STEP3:P%=&980
  140 [OPT pass
  150 BCSContinue
  160 RTS
  170 .Continue CLI
  180 LDA#&33:STA&202:LDA#&B4:STA&203
  190 LDA#1:STA&258
  200 LDA#15:LDX#0:JSR&FFF4:.Lab1 TXA
:PHA
  210 LDAstring,X:TAY:LDA#138:LDX#0:J
SR&FFF4
  220 PLA:TAX:INX:CPX#LEN($string)+1:
BNELab1
  230 JMP&BA99
  240 .string OPT FNequs("GOTO300")
  250 OPT FNequb(13)
  260 ]NEXT:Counter=0
  270 *FX247,76
  280 *FX248,128
  290 *FX249,9
  300 ON ERROR PRINT:REPORT:PRINTERL
  310 INPUT'"Enter a string ",string$
  320 Counter=Counter+1:PRINT'Counter
  330 IF string$="END" THEN END
  340 GOTO310
  350 DEFFNequs(strin$)
  360 $P%=strin$:P%=P%+LEN($P%):=pass
  370 DEFFNequb(byte)
  380 ?P%=byte:P%=P%+1:=pass
```

Listing I

```
  100 REM For Basic II only
  110 REM By Kevin Edwards
  120 REM (c) The Micro User
  130 FOR pass=0TO3 STEP3:P%=&980
  140 [OPT pass
  150 BCSContinue
  160 RTS
  170 .Continue CLI
  180 LDA#2:STA&202:LDA#&B4:STA&203
  190 LDA#1:STA&258
  200 LDA#15:LDX#0:JSR&FFF4:.Lab1 TXA
:PHA
  210 LDAstring,X:TAY:LDA#138:LDX#0:J
SR&FFF4
  220 PLA:TAX:INX:CPX#LEN($string)+1:
BNELab1
  230 JMP&BAF6
  240 .string EQUS"GOTO300"
  250 EQUB13
  260 ]NEXT:Counter=0
  270 *FX247,76
  280 *FX248,128
  290 *FX249,9
  300 ON ERROR PRINT:REPORT:PRINTERL
  310 INPUT'"Enter a string ",string$
  320 Counter=Counter+1:PRINT'Counter
  330 IF string$="END" THEN END
  340 GOTO310
```

Listing II



Listing III should be added to the main program to select the DFS when Break is pressed – Listing III contains a Basic I and Basic II version.

If you wish to select the tape system add Listing IV. This routine is the same on both Basics.

When you have typed in the appropriate listing, save it.

This program consists of the required code and a simple example which shows that a variable will be unaffected by pressing Break.

The only lines required to allow the routine to be incorporated in any other programs are lines 100-290. Don't forget to change the GOTO line number in line 240.

Running the program will set up the Break routine. Press Break and see what happens.

The program will ask you to enter a string. Enter anything and press Return. A number 1 will appear. This is a counter which is incremented each time a string is entered.

Press Break and enter another string. The counter will now be incremented and the number 2 will be displayed. This is a simple example which shows that the variable has not been affected by the Break key.

To exit from the example program enter the word END. Make sure it is in capitals.

One point to note is that the value of HIMEM will be unaffected when Break is pressed. For example, if you have a Mode 2 game running and you press Break, HIMEM will remain at &3000, although you are now in Mode 7, normally HIMEM is &7C00 in Mode 7.

In some cases HIMEM is lowered so that small machine code routines can be put below screen memory. If we had altered HIMEM we could have overwritten the machine code routine.

The utility can be turned off by changing the first byte of the Break intercept code to any number other than 76 decimal – that is *FX 247,n where n is in the range 0 to 255.

Remember – this routine cannot be stopped once executed and the program's running unless a termination routine has been included. For this reason you are advised to leave its inclusion in your own programs until the very last moment.

I hope you find it useful. I did!

```
  195 LDX#Disc MOD 256:LDY#Disc DIV
256
  196 JSR&FFF7
  255 .Disc OPT FNequs("DISC")
  256 OPT FNequb(13)
```

Listing IIIa: Basic I

```
  195 LDX#Disc MOD 256:LDY#Disc DIV
256
  196 JSR&FFF7
  255 .Disc EQUS"DISC"
  256 EQUB13
```

Listing IIIb: Basic II

```
 195 LDA#140:LDX#12:LDY#0:JSR&FFF4
 196 LDA#139:LDX#1:LDY#1:JSR&FFF4
```

Listing IV: I & II

PICTURE IT IN YOUR CLASSROOM.
OR YOUR LIVING ROOM.

Graphitti

THE GRAPHICS TABLET THAT LETS YOU DRAW, STORE, RECALL AND ALTER.

Now you can draw virtually any colour picture on your BBC Model B, without weeks of programming . . . then save it on disc or cassette for re-use.

> Recall, and alter without losing your original.

> Store on video, too. Create animated titling for your video films.

> The enthusiast can create pictures for building into other programs.

> Many educational uses – computer studies, art medium, teaching aid production.

> Graphitti Club membership available. Full program listing and other benefits. Also Educational Support Group.

> High sensitivity – precise to a single pixel.

> Introductory price £70 including VAT and post/packing, (£2 extra if disc instead of cassette). Includes handbook and tutorial disc/cassette.

14 day delivery. Cheque with order (full refund guarantee), or send for leaflet.

Pastiche SOFTWARE

62 Woodhall Road, Calverley, Pudsey, West Yorkshire LS28 5PP. Tel: (0532) 571211.

PB COMPUTER SUPPLIES

(The company that sells you what you want – not tells you what you want)

9½ x 11 (80 col) PRINTER PAPER
250 Sheets £2.95 + 75p p/p
500 Sheets £4.95 + £1.25 p/p
Please specify plain or music ruled)

A4 CONTINUOUS
(85gm) PAPER
250 Sheets £4.50 + £1.50 p/p
500 Sheets £7.95 + £2.00 p/p

	Continuous 4 × 1½ (1 across) labels	Continuous 4 × 1½ (2 across) labels	Continuous 3½ × 1½ (1 across) labels
500	£3.25	£2.95	£2.95 + 50p p/p
1,000	£5.50	£5.25	£5.25 + £1.00 p/p
2,000	£10.95	£9.95	£9.95 + £1.75 p/p

BLANK CASSETTE AND DISKETTE LABELS
FURTHER QUANTITIES ON ALL ABOVE ITEMS ARE AVAILABLE ON REQUEST

Enclose cheque/postal order payable to:

PB COMPUTER SUPPLIES
p.o. BOX 35, FAREHAM, HANTS PO15 6HL
Tel: (0329) 230353

THE BEST THING NEXT TO YOUR DFS

UPGRADE
MK II
FULLY 2nd PROCESSOR COMPATIBLE
THE MULTI-FUNCTION UTILITY ROM
FOR ALL SERIOUS BBC DISC USERS

Features Include

- **Back up all your software**
  A simple method to produce a back up of all your valuable software. No need to format the receiving disc. Simply type MIRROR and watch your exact copy being produced (including most protected discs).
- **Disc formatter – does not destroy current memory**
  Format a disc directly without need to save your work and load a utilities disc.
- **Disassembler and monitor**
  Runs in 3K of RAM from &7000 Upwards Memory dump and disassembled HEX. Output to screen or printer.
- **60 files per disc**
  Create a new catalogue to allow the user up to 60 files. First 30 files are completely compatible with non 'Upgrade' systems.
- **Full sector editor**
  Read and display any disc sector in hex and ascii with the option to amend any byte as necessary.
- **Append function**
  Speedily join useful routines and programs to form a new working program.
- **Verify functions**
  Checks all contents of disc are readable and reports bad sectors. Also an option to verify that the program just saved corresponds to your current memory contents.
- **Disc status function**
  Check files and free space on a disc without destroying current memory contents.
- **Run cassette based software**
  Simplifies the running of cassette based software on disc. Both basic and machine code.

Alligata Software Limited

1 Orange Street, Sheffield S1 4DW
Tel: (0742) 755796

Alligata
Software Ltd

RICKSOFT

The complete
Software Service
for the BBC Micro

ARCADE, ADVENTURE,
EDUCATIONAL SOFTWARE

HIRE with option to buy – £1 – £1.50 per fortnight – up to 75% discount when buying.

BUY ONLY – All the latest software at discount prices + special offers with savings of 75% on retail.

LIFE MEMBERSHIP £10
(special offer this month – write for details)

For all the information on RICKSOFT send name and address to:

RICKSOFT Dept A,
78 WARREN DRIVE, HORNCHURCH
ESSEX RM12 4QX.
Or Ring 04024 47722.

SPELLWISE
The original spelling checker for WORDWISE. Disk version checks the WORDWISE example document in 12 minutes. Disk £18. Tape £12.

SPELLBOOK
EPROM based spelling checker for use with any spooled text – very fast. Checks the WORDWISE example document in 20 seconds. 8K EPROM £25.

LANGUAGEWISE
Convert your WORDWISE word processor and Epson FX80 printer into a foreign language processor with a choice of 29 European languages. Disk only £22

TOOLKIT
The easiest toolkit to use – comprehensive set of commands for BASIC (and assembler) programmers. EPROM £22

SLIDEMASTER
Specialised database for the photographer. Tailored for perfect cataloguing of a photographic collection. Disk only £22

MAM
Write your own adventure and test it on the Beeb. Requires Acornsoft LISP to operate. ELIZA is also included on the disk – the classic response program with a difference – you write the rules to suit your requirements. Disk only £12

KERNEL_ONE
Machine code multi tasking utility. Run up to four processes simultaneously. Supplied on tape – easily transferred to disc. Comprehensive manual. £14.

SPELLWISE F
Super fast version of SPELLWISE. Six minutes for the WORDWISE example document. Disk only £22

CONTENTS
Produces a page numbered contents list. For use with any word processor which spools the text file. Disk only £22

FREE DATAWARE UTILITY – SUPERMENU
Add comments to your files and automatically LOAD, CHAIN, RUN, etc. Send £1 to cover postage etc. Supplied on tape for transfer to disc.

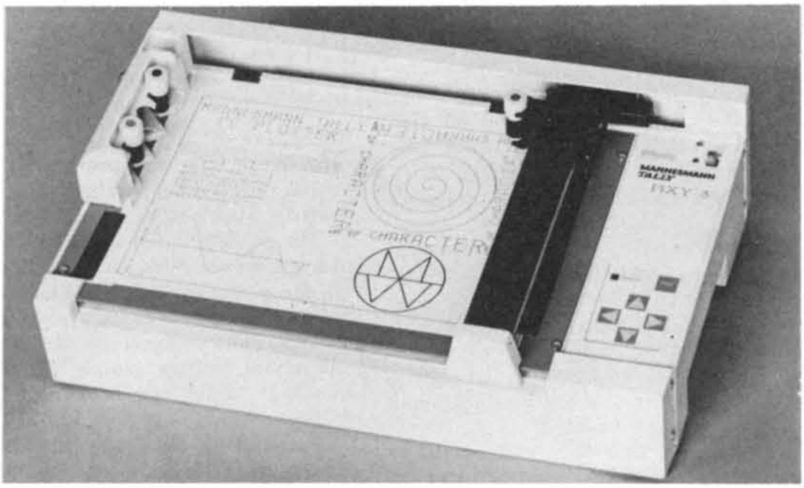
RUSSIAN LANGUAGE
For View Word processor. Disk only. Price on application.

Further details obtainable from FLOPPYCAT the DATAWARE catalogue – a reusable 40 track single density $5\frac{1}{4}$ inch disk with a 5 year manufacturers guarantee – £3 UK postage paid.

All prices except Floppycat include postage anywhere in the world.

DATAWARE
FREEPOST SWINDON SN3 4BR

Pixy 3 flat bed plotter
Mannesmann Tally



High grade colour plotter that won't break the bank

It always seems a shame when the tremendous colour and graphics capabilities of the BBC Micro are reduced to simple black and white dot matrix printouts.

As reviewed in a previous issue of *The Micro User* (August 1984) the combination of a good matrix printer and a clever dumpout ROM can produce quite sophisticated multitone hard copy, but nothing near the standard required for inserting into technical reports or theses or for making projection slides.

A good flat bed plotter will produce perfect straight or curved lines as if drawn by a skilled draughtsman. Furthermore, such lines are continous rather than made up of dots, and without visible steps. In addition, shading in various colours is usually available.

Until recently well-manufactured accurate flat bed plotters were way out of the price range of most BBC Micro owners, even for small business or educational use. The Pixy plotter from Mannesmann Tally at around £700 should now fill that gap with high grade graphics.

From very first sight of its rigid metal construction the Pixy looked a top quality machine. The plotter measures 430 x 267 x 123mm and fits neatly on the desktop beside the BBC Micro.

This instrument is designed to take A4 paper and plots over an area up to 180 x 245mm. The one reviewed here was the Pixy 3 capable of holding three different coloured pens at once and had a serial RS232C interface. Other versions are available with one pen or an 8 bit parallel interface.

The workings of the plotter can be checked even before connection to the BBC, which is just as well since ours arrived cableless until the very helpful people at Mannesmann Tally sent us one with the correct pinout.

The paper is held down with magnetic rubber strips and the pens may be moved around using touch sensitive cursor keys on the top of the instrument or a self test plot initiated by pressing left cursor at power on.

Up to eight pen colours are available and may be used on ordinary or shiny coated paper or replaced with oil based ink pens for plotting on overhead transparency material.

The programmed plotting action of this machine was amazing to watch and I have whiled away many an hour gazing open mouthed as multicolour histograms, bar charts, graphs and text were plotted by the clever little magnetic arm which intelligently wanders about the paper – "left, right, pen up, pen change, pen down" and so on. Some examples are shown in Figures I and II.

The operator's 46 page manual was thorough, especially in terms of interfacing, pinouts and command details, but was relatively unintelligible for a beginner who simply wants to plot a straight line. A few sheets related to BBC usage would have been helpful.

The command set incorporated into the plotter was extensive and the functions available are readily seen from the accompanying table. Of course the Pixy plotter will work with a variety of

→

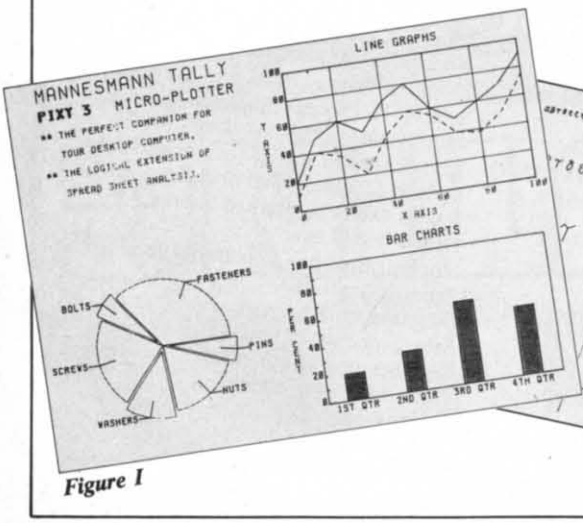


Figure I

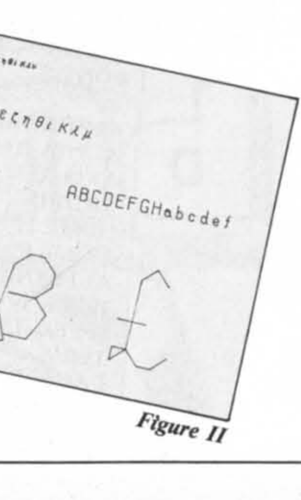


Figure II

From Page 137

micros having the correct interface and with a command set like this will give good graphics even on relatively unintelligent micros.

To give some idea of command usage with the BBC Micro two short programs are shown. Program I simply draws a straight line diagonally across the page.

Program II is my favourite as I have been trying to draw a decent spiral for months now for use in spatial pattern analysis tests – it's a very awkward shape to draw by hand!

Program line 50 draws a relative curve (]) of radius 8cm (800) starting and finishing at 0 degrees (0,0) – or the three o'clock position, and spiralling around six times (21600 = 6 x 360 x 10). The resultant spiral, length 150.8cm, is shown in Figure III. Note that the plotter produces proper circles and not ellipses as do most matrix printers.

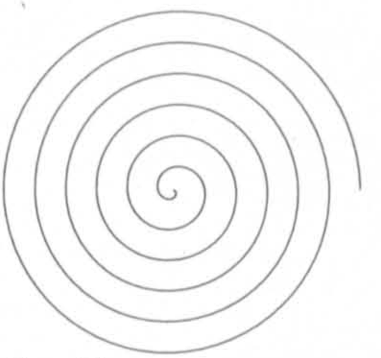


Figure III

The accuracy of the plotter on redrawing is claimed to be 0.3mm which I could well believe as a rerun of the second program produced a second spiral *exactly* superimposed over the first. Furthermore, line drawing is programmable to the nearest 0.1mm!

One other feature, which I rather take for granted after a period of using this machine until I return to my printer, is that it is very very quiet.

In all, Pixy 3 is a solidly built, technically accurate and versatile peripheral worthy of a place on any business desk or laboratory bench – and at a reasonable price.

However what use is an excellent piece of hardware if it will take you all year to write the necessary programs to draw histograms, charts and graphs for plotting? Well, have no fear, Enterprise Technology, of Warrington, to the rescue with BeePlot . . .

BeePlot
Enterprise Technology Computers

BEEPLOT is a disc based graphics software package designed specifically to run on the BBC Model B and link with the Pixy 3 plotter.

The package is run by an autoboot menu program which allows for setting up the plotter on first use. Documentation (16 pages) was fairly good, and example plots were incorporated. Some additional written simple program examples would have been helpful to beginners.

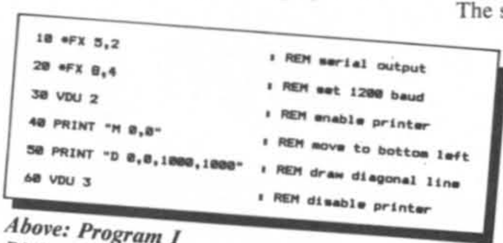
Facilities for data entry, alteration, storage and review, and for drawing pie charts, bar charts or line graphs are available together with a sketch pad for your own designs.

The user may also select the colour, shading and text to appear on the final plot, which may be of A4, A5 (half A4) or A6 (quarter A4) size.

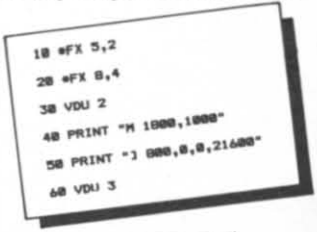
An example of the thoroughness of this program is in plotting a pie chart. The user may select or remove sectors, choose full shading or horizontal lines, vertical lines, radii or cross hatching.

The colour and texture of shading (course, medium, fine, superfine) may be chosen and sectors can be offset or exploded from the main pie chart. Text titles may be added or a box drawn around the plot. Plotting of bar charts or line graphs is similarly versatile. For example, see Figure IV.

The sketch pad option is available to



```
10 *FX 5,2                          : REM serial output
20 *FX 8,4                          : REM set 1200 baud
30 VDU 2                            : REM enable printer
40 PRINT "M 0,0"                    : REM move to bottom left
50 PRINT "D 0,0,1000,1000"          : REM draw diagonal line
60 VDU 3                            : REM disable printer
```



```
10 *FX 5,2
20 *FX 8,4
30 VDU 2
40 PRINT "M 1000,1000"
50 PRINT "] 800,0,0,21600"
60 VDU 3
```

Above: Program I
Right: Program II

COMMAND SET

LINE TYPE L	Plots continuous or broken lines, eight options.
LINE SCALE B	Specifies spacing in broken lines.
DRAW D	Draws straight line between given coordinates.
MOVE M	Moves raised pen to given coordinates.
RELATIVE DRAW I	Draws straight lines to coordinates incrementing from current position.
RELATIVE MOVE R	Moves raised pen in increments from the current position.
CIRCLE W	Draws circles, arcs or spirals.
RELATIVE CIRCLE]	Draws circles, arcs or spirals in increments from the current position.
CURVE Y	Draws a smooth curve through the given coordinates.
RELATIVE CURVE	Draws a smooth curve through the incremental coordinates given.
ALPHA SCALE S	Specifies character size and spacing, 1-14.
FONT $	Selects PRINTed character set from 10 country sets, Greek or scientific.
ALPHA ROTATE Q	Text printed in one of four orientations.
ALPHA RESET A	Default characters and orientation selected.
AXIS X	Draws axis with marked intervals.
GRID G	Draws a grid overlay.
HOME H	Homes raised pen to bottom left of plotter.
PRINT P	Prints characters.
ALTERNATE K	Selects alternate Greek character set.
MARK N	Selects one of 15 special marks.
SPEED T	Specifies pen speed from 20-200mm/sec.
TERM =	Data terminator command.
FACTOR &	Plotting magnification factor.
NEW PEN J	Selects one of three pens.

Table I

add one's own designs to a plot or simply to produce "freehand" drawings. Options – move, draw, speed, choose pen, circle, rectangle and so on – are selected from a menu and the output commands are depicted on the screen as well as being plotted by the Pixy in real time.

This option was particularly useful in learning the types of strings required by the Pixy from the outset, especially in view of the plotter's user-unfriendly documentation.

This package was fairly user friendly, especially when used in conjunction with the manual (which is also present as a Wordwise file on disc), and has good error trapping procedures.

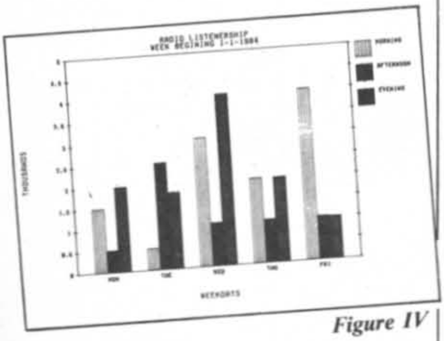


Figure IV

However initialise and work files are written to the main disc during operation so a backup copy is recommended before use.

Finally, all programs are written in Basic which should enable users to customise their packages for specific requirements, such as interfacing to their own data files.

Overall, BeePlot is a versatile, well-designed graphics package for data presentation and certainly enhances the Pixy 3 plotter–BBC Micro combination. At around £85 it seems expensive, but represents good value for money.

Conclusions

I would have no hesitation in recommending the Pixy 3 plotter with BeePlot for serious scientific use in industry, universities or colleges as well as for business or educational use. If only my own research fund could see sense and raise the necessary £800!

I do hope that a long life for this system is ensured by other entrepreneurs adding Logo-like and 3D graphic software, or, on the hardware side, opto-sensors and scribers become available for the Pixy 3.

Mike Mahon

GOING WALKIES WITH A BUGGY

Weno Buggy
Weno

BUGGIES are becoming increasingly popular with home computer enthusiasts as well as with those in education. In the August 1983 *Micro User* I looked at two buggies at the top end of the market.

Now a growing number are appearing at the low end of the market, so this time here is one of the low cost systems, the Weno Buggy. Although normally supplied as a kit, a ready-made version was provided for review, saving me considerable time.

Produced by Weno, of Romsey, Hampshire, it is an open construction on a piece of 5in x 10in plywood with the top surface covered in orange sticky backed plastic. The wheels are 3in diameter and a plastic glider provides stability.

Four HP11 batteries mounted on the board provide power for the motor. You can get rechargeable ones of the same size, but you will need a separate battery charger.

The wheels are fixed into a large plastic assembly containing two motors and a magnetic clutch arrangement which allows the motors to be locked together or run separately.

On top of this is a small printed circuit board containing three relays and an IC. A small light bulb and photo cell are connected to the motor gears and provides a feedback signal giving the number of turns the motor has made.

All the wires go to a 7-pin DIN socket which connects up to the user port through 25 feet of cable. There is a splice in the cable just before the end to change from the round cable to ribbon cable.

The buggy coped with a carpeted surface with forward and backward movements, but accuracy on turns suffered.

For best results it needs to be on a smooth surface.

Also the cable has to be held above the buggy to stop its weight dragging it back.

At times it was rather like taking a dog for a walk.

When the buggy executes a turn only one wheel is moved. This means it does not turn through its centre and so will not be suitable for adding a pen to draw its path. Only one motor is used during a turn because only one is monitored for speed.

Documentation gives sample programs and test routines as well as constructional information. Accompanying the buggy was software which implements a subset of the turtle graphics from Logo.

Following carefully the instructions in the documentation the buggy refused to move at all. It was only on the very last page that the commands to turn the buggy on and off were given – the default condition had been off!

'It was possible to make the buggy dance and weave while a triangle mimicked its gyrations on the screen'

It was possible to make the buggy dance and weave while a graphic triangle mimicked its gyrations on the screen. The software seems inspired by the Edinburgh turtle. There was even a HOOT command that produced a sound, not from the buggy, but from the computer.

The documentation claims that five degrees is a fair level of accuracy and with a little fine tuning, involving sliding the wheels along the axis, it is claimed that two degrees has been obtained. On a flat surface I did achieve five degrees without too much difficulty.

The Weno closely resembles the concept of the Edinburgh turtle but with lower cost and correspondingly lower performance. There is no positional feedback – that is you do not know if it has bumped into anything. You do however have a measure of how far the motor has turned.

It all comes down to what you want from a buggy – a free-roaming, exploring one or one to perform like a prima donna.

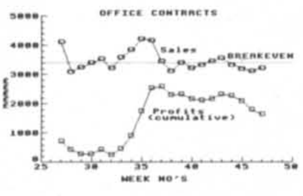
Mike Cook

Synergy Software

'PROFESSIONAL Software for the BBC Micro'

EASIPLOT

'a very good package . . . overall rating 92%' **A&B Computing**



Easiplot is a sophisticated and user friendly BUSINESS and EDUCATIONAL graph package. Voted the 14th best educational program, Easiplot has come to be regarded as an outstanding business package and excellent value for money.
This latest version is configured for single or dual disk drives and is compatible with screendump ROM's enabling large or small graph printing.
Ideal for VIEW and WORDWISE reports.

COMPREHENSIVE FACILITIES INCLUDE:
★Line, Bar, Pie, Scatter and Data charts
★5 line or bar merging
★Bar/Line conversion option
★Auto or manual scaling
★Comprehensive label and edit facilities
★Screendumps for Epson compatible printers
★Save/Load options on single or dual drives
★Provides easy access to screendump ROM's
★Grid and screensave facilities
★56 page USER MANUAL
ONLY £24.95

BIOGRAM

NEW

BIOGRAM is a new concept in computer software

For less than the cost of most ROM software the BIOGRAM SYSTEM provides you with the tools to control your state of relaxation and response to stress.

BIOGRAM uses proven biofeedback techniques to provide you with audio/visual impressions of your physiological and psychological state.

Your stress level is detected by two electrodes and is converted and relayed to the computer by the electronic BIO-MODULE. The BIOGRAM software translates this signal into a form that will enable the user to learn to influence his own state of mind.

BIOGRAM is FUN and EASY to use, just plug in the module, attach the electrodes and choose your program. Ready to run in seconds.

The BIOGRAM system comprises an electronic bio-module fitted with plugs and electrodes and a suite of programs on disk or cassette.

The BIOGRAM software package includes:

★RELAXOGRAM – a multi-level relaxation trainer and progress tester.

★LIE DETECTOR – a graphical lie detector with an automatic interrogation facility.

★P.REDUCER – a programmable phobia identifier and reducer.

The comprehensive user Manual provides many examples of biofeedback applications and experiments to try.

HARNESS THE POWER OF BIOFEEDBACK – LEARN TO CONTROL YOUR FEARS, PHOBIAS and STATE of TENSION. AN INVESTMENT FOR THE WHOLE FAMILY AT £32.95

SHARE ANALYSER

'an excellent program' **Micro User, Jan '85**
'an invaluable aid' **Northern Echo**
'instant classic' **Bristol Evening Post**
'excellent investment' **Luton News**

Share Analyser is a comprehensive reporting, analysis and charting package for the BBC Micro. Transaction and share price databases are built up for each share name and a variety of report and analysis facilities can be instantly accessed. Reports can be produced on any printer. Share Analyser is easy to use and is supplied with a comprehensive Operating Manual.

FACILITIES INCLUDE:
★Up to 20 share names per portfolio per disk
★Use as many disks as you require
★Capacity per disk – 20,000 whole number share prices and 320 purchase/sale/dividend records
★Reports include Valuation, Profit Statements, Movement Analysis, Transaction Reports etc
★Graphics facilities include Moving Averages, Rise and Fall, Superimpose, Magnification, Grid, Screenwrite, Screendump etc
★Adjusts for scrip issues etc
★Provides access to screendump ROM's

SHARE PRICES

EXCELLENT VALUE AT £24.95 – write for full details.

All Easiplot and Share Analyser specifications are for the disk version. FULL DETAILS OF ALL OUR PRODUCTS ARE AVAILABLE ON REQUEST.

Prices include p + p etc – no extras	PRICE
Biogram (cassette or disk)..BBC B only	£32.95
Easiplot 1 (cassette)..BBC B & Electron	£15.95
Easiplot 3 (including Dataplotter – disk)	£24.95
Share Analyser (cassette)..BBC B & Electron	£17.95
Share Analyser (disk)..BBC B only	£24.95

Disk orders..state 40 or 80 track (add £1.50 for overseas orders).
Write or phone for further details (0582) 33858 (Ansaphone Service).
ALL PROGRAMS ARE NORMALLY DESPATCHED BY FIRST CLASS POST WITHIN 24 HOURS AND ARE GUARANTEED FOR 12 MONTHS. Available MAIL ORDER only.

Send cheque/PO etc to Synergy Software 7, St Andrews Close, Slip End, Luton, LU1 4DE.

Second processor makes your micro rival dearer PCs

Z80 second processor
Acorn

THE BBC Micro is probably one of the most versatile machines on the market, with all the various add-ons and expansion units available, but with the Z80 second processor it can now rival the more expensive personal PCs.

Granted it's not cheap to upgrade your system as you will need 800k capacity dual disc drives, a printer and the Z80 second processor package to do it (although you may have some of these items already). But just look what you get for your money.

The Z80 second processor package retails at about £399 (was £299 till they realised it was under-priced) but even at the higher price is still good value for money.

Not only do you get the Z80 second processor with 64k RAM, but also an impressive software package which is well documented and includes examples of how each package works to help you on your way.

The software supplied runs under CP/M which is a widely used operating system on business micros. Three languages are supplied – BBC Basic (slightly different from the standard BBC Basic as it uses the Z80 microprocessor and not the 6502 supplied with the standard machine), Professional Basic (similar to Microsoft Basic) and Microfocus CIS Cobol, which is a subset of full Ansi Cobol.

Included with the CIS Cobol are two programming aids, Animator – a debugging tool which allows you to step through your Cobol program examining fields on the way and Forms2 – a program which is used in designing and testing data entry screens.

If this software were to be bought from a supplier typical prices would be approximately CP/M £175, Basic £75, CIS Cobol £425, Animator £225, Forms2 £110. This alone amounts to over £1,000 if bought on the open market.

Also included in the price is a CP/M utilities disc which enables you to work with your system. It contains such things as file copy programs and job stream controls.

There are five application packages which are designed for office use.

These are Fileplan, which is as the name suggests a filing system which can be used to keep lists of data.

Graphplan is a spreadsheet from where the information can also be shown in the form of graphs and charts.

Memoplan turns your computer into a typewriter and Accountant computerises your sales daybook, purchase daybook and cashbook. Finally Nucleus is a series of programs which allow you to design a system without prior programming knowledge.

To use the package you must have a machine with a 1.0 OS or above (according to the voucher enclosed, the pamphlet says you require 1.2 upwards). You also need a DFS ROM 1.2 and an NFS ROM 3.5.

If you do not have these version numbers or only a DFS ROM then you will have to replace your DFS ROM with a combined DNFS ROM which is supplied with the package. Fitting instructions are supplied and it is a relatively easy task.

This fitted, you are ready to look at the software and transfer it from the discs supplied onto your own discs. This is necessary as not only does it provide a backup copy but the discs are supplied in write protected covers.

You need 10 blanks to copy all the software – a bit odd at first when only eight are provided, but some are needed as data discs.

Instructions for copying are provided and several screens of text inform you of

→

Slow it right down

Slomo – Micro VDU Screen Controller
Nidd Valley Micro Products

WHILE most of us are continually trying various methods of making our programs run faster, Nidd Valley has produced a device which can slow the BBC down – even to a standstill.

Slomo comes in an attractive 7cm by 4cm casing which plugs into the BBC's tube socket. It incorporates two switches and a speed control knob.

When pressed, the first switch works as a freeze-frame which totally halts program execution until it is released. The second switch alternates between turning the speed control on and off. A red indicator above the slow-motion button lights up when it is in use.

Slomo will work with any software – Basic or machine code – and can be left permanently plugged in, but it must be switched off during disc or cassette access, as the baud rate would be affected.

There are a number of possible applications, the one which springs to mind being the slowing down of arcade games allowing children and physically disabled people access to software they might not have been able to use.

It has been tested at Seven Springs Cheshire Home for the disabled and has been found a useful device for helping to improve coordination.

As each user improved on their best score with a particular arcade game, the speed control was turned up slightly until the user could better his or her previous best score. The results have so far been very encouraging.

The freeze-frame facility could prove helpful if you ever photograph screens, and used in conjunction with slow motion you can browse through program listings at your own speed without having to go into paged mode with VDU 14 or Ctrl-N.

I found freeze frame very useful for snatching gulps of coffee while playing Rocket Raid.

Slomo is an invaluable add-on for children and physically disabled people in particular, and could be a useful aid to programming – especially for Assembly Language graphics. A special adapter is available for people who already have a second processor attached to the tube.

Robin Nixon

A GREAT PACKAGE DEAL!

For serious users of the BBC Computer.

A professional trio which can be integrated to produce an information management system of exceptional power.

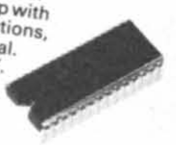
1 SCRIBE

THE PROFESSIONAL WORD PROCESSOR designed for the serious user ■ All operations fully prompted ■ No special knowledge of the computer system necessary ■ Document size NOT limited by computer memory ■ Automatic disc buffering ensures text is moved between disc and computer memory without user intervention ■ Up to 255 pages in a single document ■ 80 column display ■ on screen underline and right justify ■ See it as it will be printed.

SCRIBE comes in a chip with 5 minute fitting instructions, utilities disc and manual.

DISC MACHINES ONLY.

£59.95 + 60p p&p



2 DATABASE

A superb information management system with an incredible operating speed. 96 fields per record ■ One record 2 Kb max ■ One field 900 characters max ■ 4000 records per database ■ 16 level conditional search ■ Find any record in 2 secs ■ Wild card search ■ Record match ■ 8 automatic sub indexes ■ Total flexibility of output via report writer with auto write back to any field ■ Maths pack ■ Semi programming language.

Integrates with Scribe to give conditional search with MAIL MERGE and high powered report formatting.

Database is in a chip.

DISC MACHINES ONLY

£49.00 + 60p p&p.

Scribe & Database in one chip

£95.00 + 60p p&p.

3 DOUBLE-DOS

Double density disc interface for the BBC computer.

A high capacity database or word processor is enhanced even further with this state of the art disc interface.

The many features include ■ almost 800 Kb of CONTINUOUS file space on a standard 80 track disc drive ■ Automatically read standard Acorn files ■ Compensate for discs formatted in single density ■ Provide up to 156 files IN ONE DIRECTORY ■ Automatically read, write and format double sided drives to appear as one disc surface ■ Allow maximum use of **MERTEC** Scribe and Database.

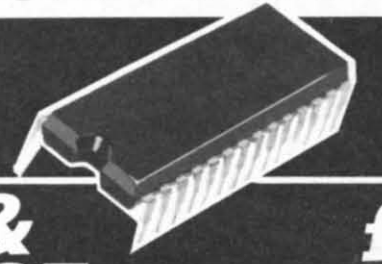
Fitting to your computer is made exceptionally safe and reliable by providing connection via a flexible ribbon cable. Full instructions provided.

£109.25 + 90p p&p

NOW AVAILABLE IN ONE GREAT PACKAGE

DATASCRIBE
IN A SINGLE CHIP!!

£95 inc VAT



DATASCRIBE & DISK INTERFACE

£195 inc VAT

Please supply the following products/information (Delete as applicable).

QTY ☐ ______________________

QTY ☐ ______________________

QTY ☐ ______________________

In enclose £ ______ Inc P&P My Credit Card No. is ______________________

Name ______________ Visa ☐

Address ______________ Access ☐ Tick which

To: **MERLIN COMPUTER PRODUCTS,**
33/36 Singleton Street, Swansea SA1 3QN. Telephone: 0792 467980

Purchasers of MCP software are provided with a free update service and an unmatched level of technical support. (Updates subject to postal charge.)

Mertec

MERLIN COMPUTER PRODUCTS

IMPORTANT NOTE:
Please check with us if you decide to use any other disc interface than Acorn or Double-Dos with Scribe or Database.

From Page 141

operations which may be carried out.

Prompts tell you what to do but basically the procedure is to insert the first disc into drive A and a blank disc into drive B. The option to reformat the disc is given. You're also asked whether you want the disc to contain the operating system.

This is always a good idea as a copy of the operating system must be present at all times, thus enabling the disc to be used independently. The overhead of doing this in terms of disc space lost is very low.

The applications I looked at in most detail were the ones that I would have the most use for, Accountant and Nucleus. The latter, being primarily for people without programming skills, tended to go against the grain as this is how I make a living, but to be fair they performed the examples well and would be quite adequate for simple applications.

I was particularly impressed with Memopad, as here is an unpretentious word processing package which is both simple and easy to use.

The documentation and applications comes with a function key card which can be slipped under the plastic strip at the top of the keyboard.

Most function keys can be used with the control key, the shift key and on their own. Movement around the page is controlled by the cursor keys.

Five documents can be handled by the program before filing is necessary and two documents can be worked with on the same screen.

The program saves any input typed to disc after a four second wait if it detects that there has been keyboard activity. This is a particularly useful feature as the function key to change to the next document is f9 and it is too easy to hit the break key if you're not careful. This sends you out of CP/M and into a Basic prompt that you can't get out of unless you load CP/M again (Ctrl & Break).

You then run a program called recover which takes you back to where you were.

Printing assumes an Epson compatible printer although there is a program for other printers such as the Acorn or Olivetti ink jet. Other than this, advice from your dealer should be sought.

Multiple copies of documents and standard page headings are just two of the options available and although it could be argued that it seems a little sluggish to actually start printing I think it would be acceptable to most people.

Also another useful application this program can be put to is to input the Cobol source lines, a much better prospect than using the CP/M editor supplied as anyone who has ever worked with it will tell you.

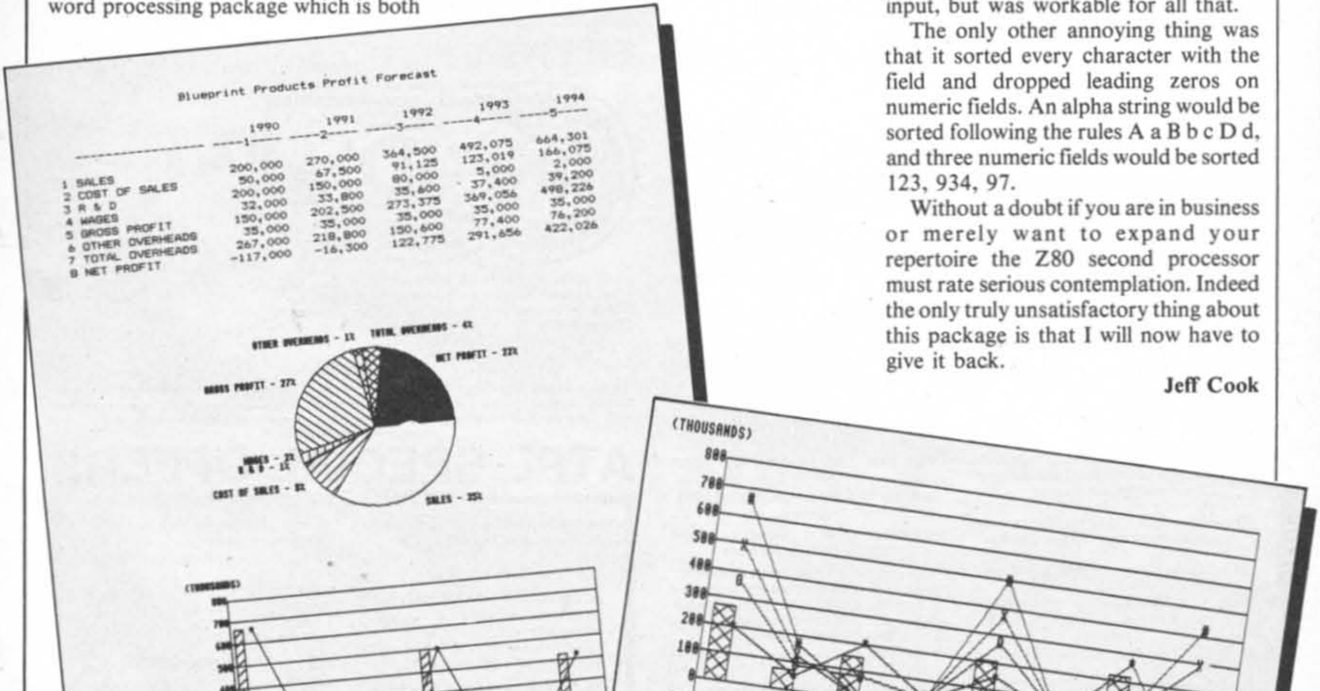
Graphplan is a good implementation of a spreadsheet. Not only was the spreadsheet satisfactory in its own right – fast working with a wide variety of commands – but the results could be displayed.

Fileplan was quite adequate for storing data which could be accessed and sorted by a variety of keys, making it in a way a mini database. It was a bit slow as it prompted for every field to be input, but was workable for all that.

The only other annoying thing was that it sorted every character with the field and dropped leading zeros on numeric fields. An alpha string would be sorted following the rules A a B b c D d, and three numeric fields would be sorted 123, 934, 97.

Without a doubt if you are in business or merely want to expand your repertoire the Z80 second processor must rate serious contemplation. Indeed the only truly unsatisfactory thing about this package is that I will now have to give it back.

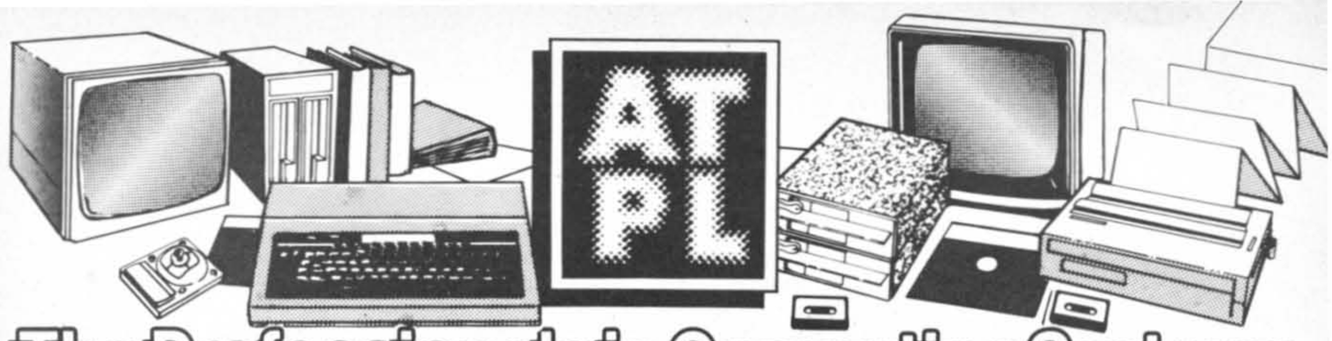
Jeff Cook



Blueprint Products Profit Forecast

	1990 1	1991 2	1992 3	1993 4	1994 5
1 SALES	200,000	270,000	364,500	492,075	664,301
2 COST OF SALES	50,000	67,500	91,125	123,019	166,075
3 R & D	200,000	150,000	80,000	5,000	2,000
4 WAGES	32,000	33,800	35,600	37,400	39,200
5 GROSS PROFIT	150,000	202,500	273,375	369,056	498,226
6 OTHER OVERHEADS	35,000	35,000	35,000	35,000	35,000
7 TOTAL OVERHEADS	267,000	218,800	150,600	77,400	76,200
8 NET PROFIT	-117,000	-16,300	122,775	291,656	422,026

Samples of printouts using the Z80 second processor



The Professionals in Computing Systems

We offer a design development and manufacturing service for companies wishing to improve their products using Microprocessor Technology.

ATPL SIDEWISE

SIDEWAYS ROM/RAM EXPANSION FOR THE BBC MICRO

£38·00
+£1·00 p+p
+VAT

- ★ **FULL SIDEWAYS ROM EXPANSION to total of sixteen ROMS.**
- ★ **16K battery backed CMOS RAM option – RAM is treated as ROM number 15 on read.**
- ★ **Software for SIDEWAYS ROMS may be down loaded and run in RAM under the true SIDEWAYS environment before transfer to EPROM using ATPL's EPROM programmer.**
- ★ **EXISTING sockets on BBC are usable and all EPROM sockets are accessible without removing SIDEWISE.**
- ★ **PLUG – IN – AND GO construction. Mounts neatly inside the BBC machine.**
- ★ **NO SOLDERING required to fit SIDEWISE.**
- ★ **FULL BUFFERING of address and data busses – prevents data bus loading problems associated with unbuffered boards.**

The BBC Computer can run software packages stored on EPROM using the four "SIDEWAYS ROM" sockets on its printed circuit board. Now that an ever increasing range of software packages for word processing, financial planning and other applications are available in this format, there is a need to expand the facility and take advantage of these developments.

ATPL has designed SIDEWISE which provides you with a further twelve sockets giving a total capability of sixteen SIDEWAYS ROMS, the maximum number capable of being supported by the BBC computer operating system. In addition to the ROM expansion, one of the SIDEWAYS ROM sockets may be defined as RAM, permitting SIDEWAYS ROM software to be loaded into the RAM area of the machine using normal OS commands. Once loaded, the RAM may be used like any other SIDEWAYS ROM and the limitation of having only sixteen sockets is effectively removed.

EVER HIT YOUR 'BREAK' KEY WHEN YOU DIDN'T MEAN TO?

BREAK
C
C
AT
PL
BREAK-
LOCK

FOR THE BBC MICRO

Fit ATPL 'BREAK-LOCK' to your BBC Micro and avoid disaster where inadvertant use of 'BREAK' will cause loss of data and/or programmes.

ATPL 'BREAK-LOCK' is a 2 position key-switch that will:

- ☐ **Prevent accidental or unauthorised use of the 'BREAK' key.**
- ☐ **Act as a security device to prevent unauthorised use of your system more effectively and cheaper than security ROMs.**
- ☐ **Easily and neatly fit in the 'Ash-tray'.**
- ☐ **Render demonstration machines tamper-proof.**

£8·53
+50p p&p
+VAT

COMPATIBLE WITH ACORN MUSIC 500
(Software available)

Also available from ATPL:
ACORN MUSIC 500
ISLAND LOGIC MUSIC SYSTEM

SYMPHONY

£125
INCLUDING V.A.T. AND DELIVERY

The Electronic Keyboard for the BBC Micro

The 'Symphony' Electronic Keyboard provides simulation of a wide range of musical instruments and sound effects through your BBC micro computer

FEATURES INCLUDE

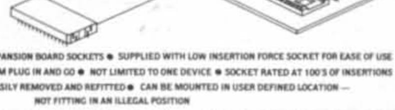
- **4 Octave 49 note C-C keyboard with full size keys**
- **Software included for up to 100 different sound effects to be created and modified whilst you are playing.**
- **Complete set of 100 effects can be saved or loaded to or from disk or cassette**
- **Effects selected by use of function keys**
- **Each effect can be given a name for easy reference and an index continuously displayed**
- **Software includes sound effects simulating musical instruments — piano, organ, violin, banjo, jazz bass, etc.**
- **Octave shift, pitch bend and auto repeat functions**
- **Optional 'sustain' foot switch for extra control**
- **External amplifier or connection to Hi-fi system options available**
- **The 'Symphony' Electronic Keyboard pack includes: keyboard and connector cable to BBC micro user port, software (please state disk or cassette) and comprehensive user guide**

ATPL offer you the full range of BBC computers and peripherals. Send an S.A.E. (A4) for full technical data and our latest competitive prices.

SIDEWAYS ROM EXTENSION SOCKET

INSIDEOUT

ONLY £13·00
p+p 50p + VAT



INSIDEOUT is designed to make a sideways ROM socket available outside the BBC computer, to allow for easy exchange of sideways ROM's.

CAN BE USED FROM BBC MODEL B OR EXPANSION BOARD SOCKETS ● SUPPLIED WITH LOW INSERTION FORCE SOCKET FOR EASE OF USE NO COSTLY CARTRIDGE PACKING ● EPROM PLUG IN AND GO ● NOT LIMITED TO ONE DEVICE ● SOCKET RATED AT 100'S OF INSERTIONS MOUNTED OUTSIDE THE BBC. EASILY REMOVED AND REFITTED ● CAN BE MOUNTED IN USER DEFINED LOCATION — NOT FITTING IN AN ILLEGAL POSITION

ATPL SPECIAL OFFERS

for BBC Computers

8K CMOS RAM for ATPL SIDEWISE EXTENSION ROM/RAM BOARD

1 off	£21
2 off	£40

8K CMOS RAM PLUS SPOOLIT for SIDEWISE RAM AREA

Turns it into an 8K or 16K printer buffer

1 CMOS RAM + SPOOLIT DISC	£31
2 CMOS RAM + SPOOLIT DISC	£50

8K CMOS RAM PLUS DFS SHIFT for SIDEWISE RAM AREA

Allows you to recover &OEOO to &18FF on a disc based system

2 CMOS RAM + DFS SHIFT	£50

8K CMOS RAM PLUS SIDESWIPE for SIDEWISE RAM AREA

Allows you to save and load sideways ROM's to disc

1 CMOS RAM + SIDESWIPE DISC	£31
2 CMOS RAM + SIDESWIPE DISC	£50

DISC BASED PROGRAMS

SPOOLIT	£10
DFS SHIFT	£10
SIDESWIPE	£10

Please Add 50p p&p + VAT

ATPL
Advanced Technology Products Limited

Station Road, Clowne,
Chesterfield, S43 4AB.
Telephone: (0246)
811585 (4 lines)

CONDITIONS OF SALE & DELIVERY

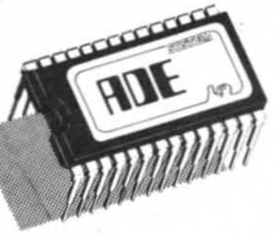
Cheques made payable to Advanced Technology Products Ltd. please allow 28 days for delivery. Cost of carriage or postage refer to each section. Quantity orders and oversea's carriage charged at cost. Condition of sales available on request.

ACCESS accepted. Carriage to be added to advertised price, then add VAT to the total.

In accordance with our policy of progressive development, we reserve the right to modify specifications without prior notice.

SYSTEM SOFTWARE

·ROMs FOR THE BBC MICROCOMPUTER·



The complete program development package for assembly language programmers. ADE is the de facto industry standard for professional software writers using the BBC microcomputer. The 16k ROM contains a full 6502 MACRO assembler, a dynamic text editor, a front panel debugging monitor and disassembler. ADE comes complete with a 160 page comprehensive reference manual and a utility/macro library disc. ADE can also be used with tape based machines.

The ASSEMBLER features macros with library facilities; nestable conditional assembly; flexible listing options (with or without macro expansion); hex, decimal, binary and ASCII data formats; dummy section; full range of arithmetic and logical operators; symbol table sort and dump; file chaining and 29 powerful pseudo ops. Source and object files are kept on disc so there is no limit on program size or location.

The EDITOR is designed with the programmer in mind for writing both programs and documentation. The editor includes a very powerful command language (including macros) that enables much editing to be done on a semi-automatic basis. It features full screen editing and deferred edit modes; no limit to document size; edit with backup facilities and a versatile text formatter.

The DEBUGGER is instantly accessible for inspecting, modifying and disassembling machine code programs. Features include full 64 byte display in hex, ASCII and disassembled format; registers; stack; single step; breakpoints; memory search and much more.

Price £60 inc vat. Please specify 40 or 80T utility disc.

Now second processor compatible - over twice as fast across the Tube© and enhancements.

ASM provides all the superb features of the ADE macro assembler on its own ROM.

The program source file may be written using any editor (even Wordwise or View!). Complete with reference manual and utility/macro library disc. Use the assembler that professional software writers use.

Price £35 inc vat. Please specify 40 or 80T utility disc.

SPY2 is a combined front panel debugging monitor and disassembler with extensive disc utilities all on one ROM. SPY2 is instantly accessible to the programmer for inspecting, modifying, debugging and disassembling machine code programs. SPY2 also features a relocator and program trace facilities. SPY2 will access any ROM either in the sideways ROM sockets or on an extension board. ROM memory may be displayed, single-stepped through or disassembled.

SPY2 includes a set of powerful disc recovery commands for interrogating, editing and retrieving data stored on a floppy disc. SPY2 also includes a disc formatter as well as a non-destructive single track reformatter.

In all SPY2 has a comprehensive set of 23 utility commands. These are supported by an excellent Reference Manual.

The SPY2 front panel encompasses all the superb, easy-to-use facilities of the renowned SPY debugging monitor PLUS additional commands for toggling and finding breakpoints; relocating machine code programs; single stepping through subroutines in one go and facilities for accessing the front panel from programs in RAM or ROM with breakpoints, OSBYTE or CTR-F.

SPY2 features a versatile disassembler with hex dump, full and intelligent disassembly. This identifies data areas in the program; these being displayed as a hex/ASCII dump. Operating system calls are labelled creating very readable code. The powerful trace facilities enable program instructions and register contents to be traced to printer whilst the program is running. Indispensable for graphics programs as they can be stepped through whilst observing the effects on the screen.

SPY2 features a disc sector editor displaying the contents of a whole sector; disc search facilities for finding byte patterns or strings and free disc space. Files may be recovered by creating a directory entry with all the data concerning the deleted file. Directory entries can be easily amended using the *AMEND command. The *FORMAT command formats discs with any number of tracks. A verify command checks discs. The *REFORMAT command is extremely useful for recovering information from a bad track, reformatting it and restoring the data. Commands are included for loading files at &1900 and automatically downloading (and running) them.

The most comprehensive of all debugging/disc utility ROMs.

Price £30 inc vat.

Now second processor compatible.

(0742) 682321

Dealer Enquiries Welcome

SYSTEM Dept. AB 12 Collegiate Crescent, Sheffield S10 2BA

PRINTERLAND

ORDERED TODAY – DELIVERED TOMORROW

FREE manual with every printer explains fully how to interface and pass control codes from your BBC to Epson compatible printers, includes multi mode screen dumps plus much more.

DOT-MATRIX	ex VAT	inc VAT
EPSON RX 80	£185.00	£212.75
EPSON RX 80 F/T +	£212.00	£244.80
EPSON RX 100 F/T	£347.00	£399.05
EPSON FX 80	£314.00	£361.10
EPSON FX 100	£425.00	£488.75
BROTHER HR5	£133.00	£152.95
DOT MATRIX PLUS NEAR-LETTER QUALITY		
CANON PW1080A	£266.00	£305.90
KAGA TAXAN	£245.00	£281.75
DISK DRIVES		
5¼ 100K S.S.S/D Case and Cables	£80.00	£92.00
ACCESSORIES		
WORDWISE +	£43.00	£49.45
BOX 10 DISKS	£14.00	£16.10
BBC/PRINTER CABLE	£10.95	£12.59
UTILITIES		
COPY-ALL Copies 99% of protected disks	£10.25	£11.79
REPLICA II. THE tape to disk copier	£9.25	£10.63

Educational, G'ment plus O'seas Orders Welcome

Delivery Printers £10.00. Other £1.00

Printerland, Unit 27, Estate Buildings, Railway St, Huddersfield HD1 1JP
Showroom Open Mon-Fri 9-6pm. Sat Morn 9-1pm
TEL Huddersfield (0484) 514105 OR (0484) 687875

The Perils of Percival Penguin

WILLOW software BBC Model B

THE PERILS OF PERCIVAL PENGUIN

- ★ Multi-screen arcade adventure
- ★ 100% machine code
- ★ Full colour mode 2 graphics
- ★ Sound adjustable during play
- ★ Exciting "animalistic" sounds
- ★ 27 Highly detailed screens
- ★ For BBC B – OS1.2

£7.95

Guide Percival across the slippery Antarctic ice to find the open sea but beware of Seals and Skuas and be very careful not to fall into a crevasse – unknown dangers await there!!!

(A DIFFICULT & VERY COMPULSIVE GAME)

LANDING PARTY (The Search for Spark)

A Deep Space Search and Rescue Adventure

- ★ A real-time adventure
- ★ A Galaxy with **1000** different locations
- ★ 5 levels of difficulty
- ★ Random locations – **every game different**
- ★ For BBC B or Electron

£7.95

One of your officers is missing. Your mission is to go and rescue him. Searching the Galaxy and planets that you encounter but beware of Zingon Spacecraft lying in wait or you may have to fight. You must avoid asteroid storms and the Black Hole and must use all your skill and judgement if you are to succeed.

EARLY MATHS: A package of four programs for children aged 3-7 years which introduce early learning and understanding of addition, subtraction and simple multiplication and division. The programs use a variety of animated routines to help the child in an instructive and entertaining way. BBC or Electron **£7.95 tape, £9.95 disc.**

EARLY WORDS: A package of colourful and entertaining programs for children aged 3-6 years featuring a variety of full colour scenes which teach the names and spelling of a large number of common objects in an easy, attractive and enjoyable way. BBC or Electron **£7.95 tape, £9.95 disc.**

TYPING TUTOR A complete Typing Tutor – for novices or those wishing to improve their skills. For BBC B.

Ideal as introduction to typewriting or wordprocessing.
Learn to touch-type easily and gain confidence in the use of the keyboard. On-screen display of both keyboard and lesson with worked examples – speeds – accuracy – time taken – full self-test facilities.
Comprehensive Book of Instructions, with hints and additional information.

£12.95
£14.95 disc

Dealer Enquiries Welcome

10% OFF IF MORE THAN ONE PROGRAM ORDERED

For Immediate Dispatch
Send CHEQUE or P.O. to

WILLOW software
The Willows, Wrington Lane,
Congresbury, Bristol BS19 5BQ
☎ (0934) 834056

PENMAN
ALL MY OWN WORK Penman
ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmn
0123456789:;<=>?@()-[~#$%&·()*+/[\]
86
87
88
A 25%
B 33%
C 42%

Suddenly, quality plotting is within reach of every computer user...

Penman is an entirely new concept in plotting.

It is robotic, working almost like the human hand to draw smooth curves, perfect circles and dead straight lines... without 'staircases'.

Penman is simple, reliable, very compact and truly portable; yet can plot on any size paper, on any smooth horizontal surface.

Use Penman at work, at home and at school... as a printer, robot, mouse and desktop plotter for BASIC and logo. Use it for design, or to produce graphs from spreadsheets, scribe captions and notices. The only limit is your imagination.

For less than £300, Penman brings quality plotting to every computer user.

PENMAN

Penman Products Limited
8 Hazelwood Close, Dominion Way,
Worthing, W. Sussex BN14 8NP.
Tel: (0903) 209081 Telex: 946250

Speaking of speech synthesisers...

THE BEEB BODY BUILDING COURSE

Part 24

IT is well known that the history of publishing is one of endeavour and striving . . . and very long lunch breaks. It was after one such lunch break that the editor bumped into my desk and said "Speech, what do you think?"

"Very good, considering how drunk you are", I replied. Have you ever tried to straighten out a bent soldering iron?

It transpired he was planning several articles concerning speech synthesis and he was requesting that I make a contribution.

He was also getting a little tired of how smug I was at having the only micro whose 'ash tray' was being used in the way Acorn intended and so I will let you all in on the secret.

The BBC Micro is quite remarkable in that it appears to have been designed by a committee with each member sticking out for his – or her – own pet feature. Then it was ripped apart by the marketing men so that it could be sold at the price.

The result is there is much scope for enhancement and the built-in speech synthesiser falls into that category. So let's see how it can be incorporated.

There are two types of synthesiser systems in use today – those whose data was originally spoken through a microphone, and those whose data is computed.

The microphone or encoded systems produce the better quality but have a vocabulary limited to those words etched into a ROM.

The phoneme or allophone systems use parts of words that you can string together to make any word. Naturally the quality is lower – in some cases a lot lower.

The mind plays a trick on us when listening to words. If we know what is being said we hear it clearer.

Some dealers make use of this fact by displaying the words on the screen as

By MIKE COOK

the micro speaks to them. When faced with this, try looking away from the screen to get a more realistic impression of the quality.

The Acorn speech system is a high quality fixed vocabulary system. The new ROM from Computer Concepts allows it to speak using allophones as well and so you get the best of both worlds.

I heard the Computer Concepts' system at the Christmas Electron & BBC Micro User Show and was very impressed with the quality considering it is an allophone system.

Basically, fitting the synthesiser is straightforward if you have one of the later boards in your micro. However, if you have an issue 2 or 3 computer board or an issue 1 keyboard you will have to perform some surgery on them to make the speech system work.

While instructions are supplied when you buy the Acorn speech system, I felt that those of you with early boards might like to know what you are letting yourselves in for before parting with the readies.

Also you can save money by just fitting chips. Let's see how.

The speech system has two chips – the synthesiser chip which generates the sound and the vocabulary chip which generates the data for what type of sound is to be made.

They are both Texas Instruments chips – the synthesiser being the TMS 5220 and the vocabulary being a TMS 6100 type specially made for Acorn. There are other vocabulary chips which

Allophone-gotta new speech chip?

From Page 147

can be used as we shall see later.

The simplest form of upgrade involves simply plugging these into the sockets – the TMS 5220 into the IC99 socket and the vocabulary chip into the IC98 socket. However on the earlier issue 2 and 3 boards some tracks will have to be cut, as follows:

Basically there are two modifications – one supplying power to the vocabulary chip and the other swapping over the interrupt and ready signals from the system VIA (Versatile Interface Adapter) IC3 and the synthesiser chip.

Acorn got this wrong the first few times. Incidentally, they also got wrong the connections from the VIA to the TMS 5220. This is because Texas Instruments label the data lines opposite to convention in their data sheets.

They label the most significant bit D0 instead of the conventional D7. They do state this but it was missed by the designers. As a consequence all data sent to the chip is byte reversed by the operating system, a software fix.

Save £25 on Acorn's speech extension

Give your micro the power of speech with the official Acorn speech extension. Quick and easy to install, its 164 words and word parts will add new dimensions to your programming.

And our special offer makes it cheaper than ever before – £25 off the recommended price!

See Page 184 for further details.

You will need to completely remove the computer board from the box. Have you noticed that most instructions start by telling you to remove the four screws labelled "FIX"? If you don't know that or cannot work it out, I don't think you should be attempting the modification in the first place.

There you are, now I've done it!

With the case open you need to remove the power leads and video output wires and take off the keyboard and its connecting ribbon cable. The loudspeaker wire will also need to be unplugged.

Make a careful note of the original positions as you have to put it all back, preferably with no bits left over.

Unscrew the board and remove it. Turn it over to look at the track side with the edge that was under the keyboard nearest you. Now locate the right hand most row of IC98. This will be found at the right hand edge about 3in up from the corner.

The lower two pins are pins 13 and 14. You will see that they are connected together by a light green track, and look something like Figure I.

Cut this joining track. I find the best way to do this is with a sharp model maker's knife. Make two cuts carefully across the track as close together as you can, then use the knife to scrape away the copper in between your two cuts. Use a side to side gouging action to do this.

To ensure the tracks are cut deep enough, it is best to do several light, controlled cuts rather than a heavy deep cut as there is less chance of the knife going out of control and scything into the adjoining tracks.

Having done that you must now join pin 13 to earth. Pin 13 is the upper pin and a convenient earth is pin 3 of the plug strip PL13 located nearby. A short length of insulated wire should do the trick.

Strip the insulation off both ends and make sure you tin and trim the wire before soldering them to the two pads with the merest touch of a soldering iron. The final result should look like Figure I AFTER.

Now it's time to get the two wires to the synthesiser sorted out. Still on the underside, locate IC3. This is about 3in up and 3.5in along from the bottom right hand corner.

Pins 16 and 17 are on the right hand side of the socket – as viewed from the track side. Opposite these pins a short distance to the right are two plated-through holes. Solder two wire links crossing over these connections as shown in Figure II.

Now that the correct connection has been made we have to undo the incorrect one. Turn the board over and locate the gap between IC3 and IC78 – the latter will not be fitted if you do not have a disc upgrade.

About four pins up from the base of IC3 you will find two tracks going to holes. It is these tracks which must be cut, again taking care not to damage

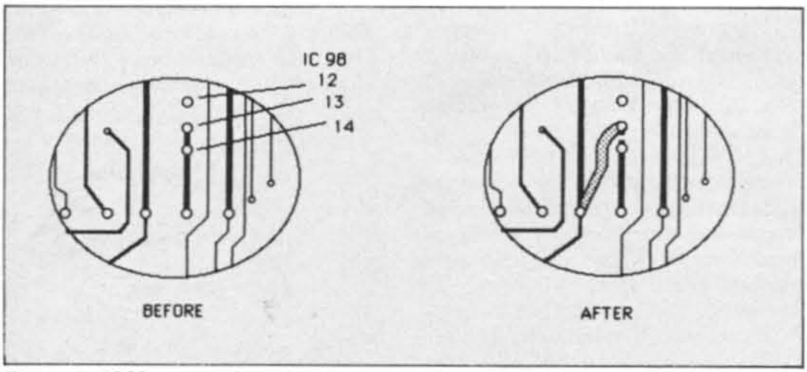


Figure I: IC98 cut track and link

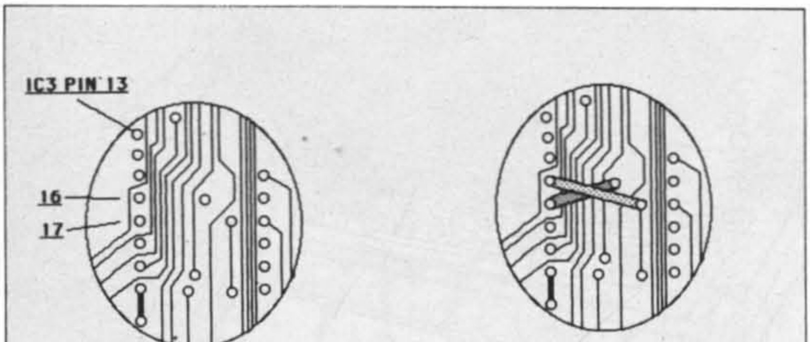


Figure II: IC3 pin 16 and 17 cross

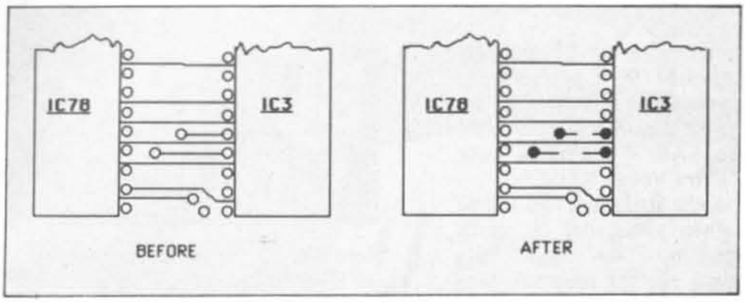


Figure III: Breaking wrong connection

nearby tracks. This is shown in Figure III.

The modifications to the main printed circuit board are now complete and you can use your speech synthesiser. However, if you have the official Acorn speech system there is a little more to be done.

It is possible to connect extra vocabulary ROMs to the system to enable you to produce more words. To do this you need to solder a 10-way plug onto the printed circuit board and attach it to the main board with a ribbon cable.

Also the two edge connector sockets need to be soldered in just under the so called ash tray hole in the case lid and a cover to the lid clipped on.

As there are 17 holes in the printed circuit board and only 12 leads on the edge connector, you must use the lower 12 holes to get the correct connection. If you look at the track side of the keyboard about 5in from the top left hand corner you will see the keyboard issue number.

If you have Issue 1 – and there are a lot about – you will need to make a further modification.

The bottom two pins are linked together and they should not be. Again slice carefully through the copper as shown in Figure IV. Then a wire needs to be taken to zero volts. If you locate the brown disc ceramic capacitor on the component side you can pick off the required voltage from the lead nearest the keys.

Of course use the pad on the underside of the board to make it a neat job.

Reassemble the micro, but if you have an issue 2 or 3 computer board do not screw it all down yet. Remember there is now an extra ribbon cable to attach as well as the keyboard. Make sure they are both aligned properly.

It is very easy to get an extra pin over at one end and a corresponding socket over at the other. If you do, the micro will not work, but be assured that it has happened on numerous occasions to my students with no permanent damage to either students or micro.

Turn the micro on and listen to the reassuring double bleep.

Then type in:

```
SOUND -1,GET,0,0: UNTIL 0
```

Next, press any key to hear pearls of rubbish emanate from the speaker.

Now the pitch of the voice must be set. You can do this on some boards by altering the variable resistor just to the left of IC98 labelled VR2. Twiddling this will give the effect of a voice, varying between Darth Vador and Micky Mouse. Remembering it is supposed to be Kenneth Kendal, adjust it to suit.

If you built my frequency measuring system in the September 1984 issue of *The Micro User* you could use the micro to adjust itself. Pin 3 of IC99 should have 160KHz to be spot on. Actually you won't notice very much difference if this is within 100Hz.

However some boards do not have VR2 on them. Yes, you guessed it – issue 2 and 3. Also I am told that some of the newer boards have not got this fitted either. In this case if it sounds OK leave it alone, but in case it is too far out, two resistors are supplied to replace R32.

Try them to see which gives the best results. R32 can be found between IC98 and IC99. The best way to remove it is to grip it with a pair of pliers and apply a soldering iron to the track side.

You can enlist the help of a trained octopus if you have any trouble. Any dealer should be pleased to hire you this for the afternoon.

At last batten down the hatches and return your micro to its normal state – that is, put it back together. Full instructions on how to drive the speech system are given in the Speech System User Guide so I will not repeat them here.

However you might want to add extra vocabulary ROMs to the system. These have not been previously available in plug-in form as far as I know.

There are four extra ROMs made by Texas Instruments which have in them specialised words needed in avionics, weather and military use as well as a general control vocabulary.

All that is needed is a small printed circuit board with gold plated edge connectors to plug into the sockets

→

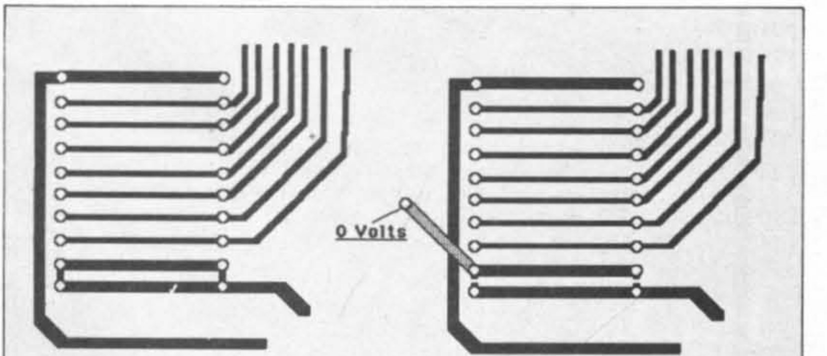


Figure IV: Keyboard modification

THE BEEB BODY BUILDING COURSE

From Page 149

hidden under the ash tray. The circuit is shown in Figure V and, as you can see, is not very exciting.

There are four different chips and only two sockets so I have laid out two printed circuit boards. One takes a single vocabulary chip, and the second two.

As there are only one or two ICs to solder onto one board, it is not worth offering them as a kit, but each one may be bought ready assembled with the form below. If you really want them separately then say so in your order and they will be sent as a kit for no extra charge.

In order to use them you need to use the command that addresses the memory directly inside the ROMs. They are also bank switched to allow several ROMs to be placed in the system at one time.

The bank switch address is the first parameter in the sound statement. To say the word GUNDISH, for example, you need to give the command:

```
SOUND &FFB2,4743,0,0
```

with the VM61004 military vocabulary ROM fitted. Incidentally does anyone know what it means? Maybe it's how you feel on a Monday morning.

I've written a program that allows you to create a data file for each vocabulary chip and also to listen to it. However it, and the accompanying data files are rather long so, regrettably, we haven't been able to include them with this article.

Worry not, though, they're all on this month's cassette. Or, if you're really into typing, the listing and data files are available from *The Micro User*. Just send us an SAE – and mark your envelope "Extra Vocab SAE".

Of course, the listing and files will be included when you order the extra vocab chips.

You simply run the program, then enter the base address and a few words and their associated addresses. Next press Return twice and listen to them using the + and – keys to move through the entries.

Finally press Return again to write the file. I used the file names corresponding to the chip numbers.

The data for the files will tell you what words are on each of the chips. The type VM6100A is the Acorn system chip and the data is included for comparison with the others.

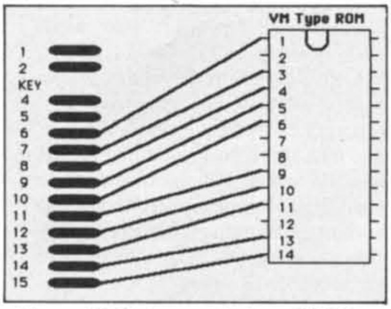


Figure V: Extra vocabulary ROM

Note that this chip is the only one to speak English. The rest talk American – Z is pronounced *zee*.

Acorn also talk about this socket being used to load programs. However this is not as simple as it sounds.

The VM series of ROMs are serial – that is the data comes out one bit at a time. Also the address is loaded four bits at a time. In order to have this used by a program ROM you need to make the ROM with this type of interface.

Without a custom, mass-produced chip this would not be economical as the logic you would have to build around any conventional eprom would be quite extensive. I estimate it would cost about £40 to build.

So until someone sinks enough money into a custom chip you will not see programs produced for the ash tray socket. However, if someone did produce such a device it would be uncopiable.

Well, having finally got your micro to speak to you the only problem is to get it to stop. I'll leave you to sort that out for yourself so, until next month, keep LISTening.

ORDER FORM

ROMs can be purchased singly on single PCBs, in pairs on double PCBs and either assembled or unassembled.
Please indicate your requirements below, ensuring that you make an entry in at least one box in each section.

Section 1

(No.)
____ VM61002 General Vocabulary
____ VM61003 Weather/Time Vocabulary
____ VM61004 Military Vocabulary
____ VM61005 Avionics Vocabulary

Section 2

(No.) Please send me the ROMs detailed above on £
____ Single PCB(s) (with one ROM) @ £23.50 ____
____ Double PCB(s) (with two ROMs) @ £44.00 ____
Prices include VAT and P&P TOTAL ____

Section 3

____ Assembled
____ Unassembled

I enclose my cheque payable to Musbury Consultants

Name ________________

Address ________________

Send to: **Musbury Consultants, 8 Fairhill,**
Helmshore, Rossendale BB4 4JX.

The order form for Body Building kits 19, 20 and the Trakball may be found on page 189 and the remainder on page 192.

THE BEEB BODY BUILDING COURSE
THE BEEB BODY BUILDING COURSE
THE BEEB BODY BUILDING COURSE
THE BEEB BODY BUILDING COURSE

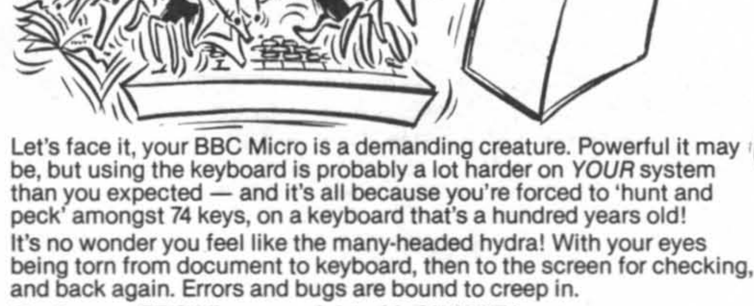
These are the listings you will receive if you simply send a stamped addressed envelope to Body Building Listings, The Micro User, Europe House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

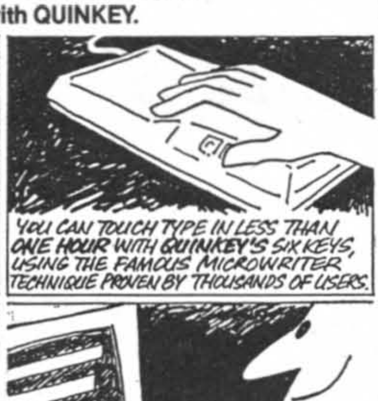
IS KEYBOARDING TURNING YOU INTO A 'MICRO MONSTER'?

Let's face it, your BBC Micro is a demanding creature. Powerful it may be, but using the keyboard is probably a lot harder on *YOUR* system than you expected — and it's all because you're forced to 'hunt and peck' amongst 74 keys, on a keyboard that's a hundred years old!

It's no wonder you feel like the many-headed hydra! With your eyes being torn from document to keyboard, then to the screen for checking, and back again. Errors and bugs are bound to creep in.

Master your BBC Micro overnight with QUINKEY.


BBC MICROCOMPUTER
QUINKEY REPLACES EVERY CHARACTER, COMMAND AND FUNCTION ON YOUR BBC (EXCEPT BREAK) AND SIMPLY PLUGS INTO THE ANALOGUE PORT AT THE BACK.
YOU CAN TOUCH TYPE IN LESS THAN ONE HOUR WITH QUINKEY'S SIX KEYS, USING THE FAMOUS MICROWRITER TECHNIQUE PROVEN BY THOUSANDS OF USERS.
YOU ONLY NEED ONE HAND TO USE QUINKEY—AND THE LONG LEAD ALLOWS YOU TO SIT BACK, RELAX AND CONCENTRATE ON WHAT'S REALLY IMPORTANT—YOUR WORK.
ACCURACY AND SPEED COME NATURALLY BECAUSE YOU'RE TOUCH TYPING YOU CAN DEVOTE ALL YOUR CONCENTRATION TO READING ACCURATELY FROM THE SCREEN OR DOCUMENT.


AND, FOR THOSE LONG LISTINGS, QUINKEY REALLY IS A MUST. BECAUSE YOU NEED ONLY ONE HAND, THE OTHER IS FREE TO FOLLOW DATA.

Microwriter Ltd.,
2 Wandle Way, Willow Lane,
Mitcham, Surrey CR4 4NA.
Tel: 01-685 0300

microwriter
QUINKEY

WHAT YOU GET FOR £49.95

1 QUINKEY KEYBOARD

Five keys (plus control key) pressed in easily remembered combinations, give all inputs except Break. Can be used in conjunction with BBC keyboard or as entire replacement.

2 QUINKEY INTERFACE

Four-channel connector for up to four Quinkeys.*

3 SELF-TEACH GUIDE

Contains everything you need to know. Instantly learned, simple mnemonics based on widely used technique of Microwriting ensure you're touch-typing in under an hour.

4 PROG & WP SOFTWARE

Supplied on cassette (User Guide shows how to transfer to disk).

PROG merges easily with applications programs. WP enables Quinkey to be used with word processing packages such as Wordwise, View and Edword.

TECH SPEC — When invoked using CHAIN "WP" or CHAIN "PROG", loads at the current PAGE value and moves PAGE up by 768 bytes. No zero-page locations required. Interrupt service vector IRQ2V, correctly chained.

TESTED COMPATIBILITY — BBC model "B" OS E.I BASIC I or BASIC II (except when using INKEY with negative argument), DFS 0.90. View A1.4, Wordwise 1.17, Edword.

PLUS TRY QUINKEY ON OUR MONEY-BACK GUARANTEE

So confident are we of our claims that we offer a 14 day money back guarantee. So act now by sending the coupon below.

To: Microwriter Ltd., 2 Wandle Way, Willow Lane, Mitcham, Surrey CR4 4NA.

I would like to take advantage of your special money-back guarantee and realise that I can return the pack(s) undamaged within two weeks of delivery if I am not fully satisfied for a complete refund.

Please send ...... Quinkey pack(s) @ £49.95 (plus £2.50 p&p) £ ....

*Tick box ☐ More information about the educational pack of 4 Quinkeys and software for schools.

I enclose a cheque made payable to "Vector Marketing/Microwriter Ltd" for £ ....
or debit my Visa/Access credit card No. ....

Signed ....

Name ....

Address ....

....

Please allow up to 28 days for delivery. Reg. No. 1374069

The Ultimate Tape to Disc System....

THE MOST EFFECTIVE TRANSFER UTILITY CURRENTLY* AVAILABLE, OR YOUR MONEY BACK!

This system is ROM based and has the following features:

- Instant access.
- Allows use of all available RAM, (&400 to &7FFF).
- Can handle any length of program.
- Can handle any number of programs.
- Can save to any disc.
- Very user-friendly, (menu driven).
- Contains two transfer routines to ensure effective loading of 99% of currently available software.
- Adventures normally taking six minutes to load will now take about five seconds.
- The system automatically switches to TAPE filing after loading, so that you can still load/save games positions, etc.

••••• PRICE £18.00 (including V.A.T. and post) •••••

At present available for the BBC 'B' O.S. 1.20 with single density interfaces using the standard 8271 chip (e.g. Acorn, Amcom S/D, Watford S/D).

* February 1985.
N.B. This ROM solely provides convenience in loading, and does not break software protection.

Also: The **ADDCOMM** ROM
40 new commands for the BBC 'B' O.S. 1.20 and Electron computer with ROM board. GRAPHICS, TOOLKIT, LOGO GRAPHICS and GENERAL PURPOSE statements all on one ROM.

£28.00 with 72 page User Guide, (including V.A.T. and post).
Or send stamp for detailed brochure.

Vine Micros

Available from:

VINE MICROS, MARSHBOROUGH,
NR. SANDWICH, KENT,
CT13 0PG.

(Or your local Computer Dealer)

MU 3/85

**DEPT. CES
18 HAZELMERE RD,
STEVENAGE, HERTS
SG2 8RX.**

QUAL-SOFT

STEV (0438) 721936

VERDICT ON A SOCCER MANAGEMENT SIMULATION

"Congratulations on a program that actually corresponds to the game of football". David McClelland, Bangor.
"Your game is excellent, the best simulation for any computer". N.W. Edwards, Beaconsfield.
"I think you have in your product a complete simulation of the highest standard". W.R. Moys, BRIXMIS.
"So realistic it certainly is the best game I've played (and not just on the BBC!)" W.M. van Leeuwen, Holland.
"What a superb management game it is". Neil Ormsby, Leeds.
"Thanks for a brilliant program". P.J. Sterry, Peterborough.
"FANTASTIC!" R. Foster, Benfleet.

We could fill pages of this magazine with such comments. But let us introduce you to:

**BBC 'B'
(all OS)**

DIVISION ONE '85'

**TAPE £9.95
DISC £12.95
(all inc.)**

DIV ONE '85 is a role playing game in which you are the manager of a newly promoted 1st Division side. You have a squad of 18 players and a further 15 players available on the transfer market. You must first confirm yourself as a 1st Div. side, assessing your weaknesses and strengths, and then bring along your youngsters to replace your "veterans" (the game lasts for 5 seasons) and intelligently using the transfer market. All decisions are based on YOUR judgements about skills and abilities as you watch your team play through a 42 match season, each match being SIMULATED in your Micro and displayed on your TV or VDU.

QUALSOFT comments: This game makes justifiable the term "strategic" as applied to soccer management games. Strategy implies "planning ahead" and decisions taken in the 1st season may not bear fruit until the 4th or 5th seasons (up to 20hrs later in the game) but these decisions must be taken if you are to win the Championship. This game will test your footballing knowledge to the full, coping with injuries, suspensions, financial limitations, a not always helpful press, ageing players, inexperienced youngsters etc, etc.

CURRENT OWNERS: You will receive a discount of £7 on your tape, £9 on your disc of LD1 against the above.

All orders DIRECT SALE. Orders by post delivered in 3/4 working days. ACCESS telephone authorisation 1/2 days.

TAPE DISC*
£9.95 ☐ DIVISION ONE '85 ☐ ☐ £12.95
40T 80T

* Uses split program technique to allow fully disc compatible SAVE and LOAD facilities. Downloaded TAPE programs still require TAPE for SAVE and LOAD data.

Name: ....
Address: ....
....
....
Card No: ....

Microdis

46 MIDDLE STREET, BLACKHALL, HARTLEPOOL,
CLEVELAND TS27 4EA
Tel: 0783 872430

MAIL ORDER ONLY

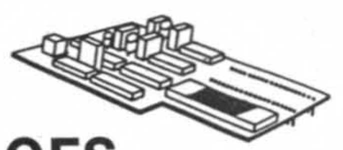
NOTE: ALL PRICES INCLUDE VAT AND CARRIAGE

	Ex VAT	Inc VAT & Carriage
PRINTERS		
Dot Matrix		
Seikosha GP50A (40 column)	83.60	100.75
Seikosha GP50F (Spectrum)	83.60	100.75
Seikosha GP100A (80 column)	133.50	158.95
Seikosha GP100 (Spectrum)	155.50	183.45
Seikosha GP250X	171.00	199.95
Seikosha GP700A (7 colour)	276.50	322.60
Epson RX80	189.00	221.95
Epson RX80 F/T	217.95	255.25
Epson FX80	315.00	366.95
Shinwa CP80	167.20	196.95
Taxan Kaga KP810	246.95	288.75
Taxan Kaga KP910	334.95	389.95
Daisywheel		
Daisystep 2000	215.95	252.95
Quen Data	219.95	257.50
Juki 6100	317.75	369.95
MONITORS		
Green		
Sanyo 12N	69.00	83.95
Sanyo 12N (Hi Res)	89.50	107.50
Colour 14" Screen		
Sanyo SCM14N (400 dots)	169.00	198.95
Sanyo SCM14M (600 dots)	269.50	314.95
Sanyo SCM14H (800 dots)	382.00	443.95
Microvitec		
BBC		
1431 (452 × 585 dots)	169.95	199.95
1451 (653 × 585 dots)	225.95	264.45
Sinclair		
Spectrum 1431	215.95	252.95
QL 1451	191.95	225.45
IBM		
IBM 1456	342.95	398.95
IBM 1446	429.35	498.95
MEDIA		
Cumana Diskettes 5.25" boxed in 10's with Plastic Library Case		
40 Track SS SD	13.50	16.50
40 Track DS DD	13.50	16.50
80 Track SS SD	13.50	16.50
80 Track DS DD	13.50	16.50
HEAD CLEANING KITS		
3M Standard	12.50	15.90
De-Luxe	15.60	19.50

SPECIAL OFFERS

	Ex VAT	Inc VAT & Carriage
COMPUTERS		
BBC Model B	335.74	389.95
COMPUTERS		
BBC Model B with QFS Disc Interface	404.95	469.95
Electron (complete with Acorn cassette recorder, 3 games cassettes and Yorkshire TV book)	179.95	209.95
ANCILLARIES		
Acorn Data Recorder	27.95	34.95
Sanyo DR101	28.95	35.95
Sanyo DR202	36.95	45.30
Teletext Receiver	184.95	215.35
Speech Interface Kit	46.90	55.50
6502 Second Processor	173.50	202.17
Z80A Second Processor	308.95	357.95
CUMANA DISC DRIVES		
BBC CSX (Excluding PSU)		
CSX100 40 Track Single Side (100k)	94.95	113.85
CSX200 80 Track Single Side (200k)	118.95	141.45
CSX400 80 Track Double Side (400k)	138.95	164.45
With PSU		
CS100 40 Track Single Side (100k)	114.95	136.85
CS200 80 Track Single Side (200k)	138.95	164.45
CS400 80 Track Double Side (400k)	158.95	187.45
Dual Drives (with PSU)		
CD200 2 × 40 Track Single Side (200k)	203.95	239.20
With 40/80 Switch		
CD400S 2 × 80 Track Single Side (400k)	258.95	302.45
CD800S 2 × 80 Track Double side (800k)	305.95	356.50
EPROMS		
2764	5.60	7.40
27128	18.50	22.25
LISTING PAPER		
Boxed 2,000 Sheets		
60 GSM (Listing) 9.5" x 11"	10.50	15.60
85 GSM (Letter Quality) 9.25" x 12"	13.40	19.50

FREE PRINTER LEAD
AND LISTING PAPER WORTH
£14 WITH EVERY PRINTER



QFS
DISC UPGRADE
£95

or £109.25 with VAT and Carriage

- **Supports SINGLE and DOUBLE Density**
- **Automatic Density Recognition**
- **Acorn Compatible**
- **Supports Single and Double Sided Discs**
- **Automatically recognises 40 or 80 track discs**
- **Firmware format and verify**
- **Simple to fit – supplied with instructions**
- **Complete with manual**
- **AVAILABLE NOW**

Tomorrows Dream Software Proudly Presents

TITAN

The debugging monitor utility for machine code programs on the BBC B

Includes:

- ★ Single stepping through RAM and ROM – including operating system
- ★ Intelligent memory mover
- ★ Breakpoints in ROM
- ★ Microsecond timer
- ★ Machine code program relocator
- ★ Single step through graphics routines
- ★ Intelligent masked string search routine

Plus – "Front panel" display, OSCLI commands available within debugger, conditional breakpoints at relative branch instructions, display of four memory windows updated during single stepping, user zero page preserved during single stepping, arithmetic operators + – × ÷, output to printer, ASCII dump, hex dump, disassembly, block fill, plus much more.

With complete instruction booklet

ONLY £10 on tape, £12 on disc, from TDS

Dealer enquiries welcome

Written any good software? We pay top rates for original programs

Please send me a copy of Titan on tape (£10)/disc (£12).
Please specify DFS when ordering disc version.
I enclose a cheque/PO for________ payable to Tomorrows Dream Software.
Name (BLOCK LETTERS) ________
Address ________

Send this coupon with your cheque/PO to:
TDS, Richmond House,
1B Sydenham Rd, Bristol BS6 5SH.

MU3/85

Twillstar reliability for Home

COMPUTERS

BBC

BBC Model B	£362.00
BBC Model B + Disc Interface	£445.00
BBC Model B + Econet Interface	£447.00
BBC Model B + Disc & Econet Interface	£517.00
Z80 Second Processor	£399.00
6502 Second Processor	£199.00
Acorn Bitstick	£375.00
Acorn IEE Interface	£325.00
BBC Prestel Receiver	£132.00
BBC Telex Receiver	£225.00
Speech Interface	£54.00

ELECTRON

Electron	£189.00
Electron Me+My Micro Pack	£229.00
Plus 1 Interface	£59.95
Plus 3 Interface (DFS/Drive)	£225.00

BBC FIRMWARE

View Word Processor	£55.00
Word Wise Word Processor	£37.00
Viewsheet	£55.00
Speech Synthesiser	£54.00
UltraCalc Spreadsheet	£74.00
Graphics ROM	£32.00
Disc Doctor	£32.00
Print Master	£32.00
Communicator	£65.00
Acorn 1.2 O/S	£11.50
Acorn Basic II	£32.00
Termi Emulator	£32.00
Gremlin Debug ROM	£32.00
Caretaker	£32.00
Toolstar	£33.00
Commstar	£33.00
BCPL ROM	£99.00
System ADE ROM	£60.00
System SPY ROM	£30.00
Edword User Pack	£44.00
Edword Teacher Pack	£25.00
Merlin Scribe	£59.00
ExMon (Beebug)	£27.00
Toolkit (Beebug)	£27.00
Mu-ROM (Beebug)	£27.00
Gemini Datagem database	£125.00
BBC UltraCalc	£69.00
BBC Toolbox	£20.00
BCPL ROM + Discs + Manuals	£95.00
Logo	£69.00
Iso-Pascal	£69.00
Beebug Help ROM	£25.00
Beebug Sleuth	£29.00

EXPANSION BOARDS

Raven 20 (upgrade BBC to 52K computer)	£69.95
RAM-AMP 6 socket + 16K RAM	£55.00
6 Eprom socket + 32K RAM	£65.00
IX16K RAM Board	£20.00
Eprom Programmer (Blow all your BBC Eproms)	£49.00

BBC UPGRADES

A-B upgrade	£110.00
DFS Interface	£120.00
Econet Interface	£69.00
Speech Interface	£54.00

DISC UTILITIES

View Index	£14.95
View Printer Driver generator	£11.50
Hi-View	£59.00
Acornsoft Database	£15.00
Clares Betabase 40/80	£23.00
Clares Graphdisk 40/80	£12.95
Clares Replica II Disc Copier 40/80	£11.95
Clares The Key 40/80	£12.95
Beebugsoft Masterfile	£19.00
Beebugsoft Design	£19.00
Microtext (cassette)	£49.80
(disc)	£59.85
BCPL Calculation Package	£19.00
Spellcheck II	£31.00

MONITORS

Microvitec 1431 Standard Res	£189.00
Microvitec 1451 Medum Res	£289.00
Microvitec 1441 High Res	£399.00
Microvitec 2031 20" Standard Res	£315.00
Microvitec Sinclair QL	£270.00
Philips BM7502 V.H. Res (Green)	£85.00
Normende TV/Monitor + Remote control	£249.00
Ferguson CTV + RGB	£240.00
Philips CTV + RGB	£229.00
Kaga RGB Vision III 12"	£369.00
Kaga 12" H.R. Green	£118.00
Sanyo SCM 14" VHR	£425.00
Novex 1414 colour Monitor	£215.00

DISC DRIVES

BBC Single 100K Drive	£99.00
BBC Dual 200K	£189.00
BBC Dual 200K 40 Track	£159.00
BBC Dual 400K 40 Track	£299.00
BBC Single 400K 80 Track	£175.00
BBC Dual 800K 80 track	£349.00
BBC Single Power Supply	£20.00
BBC Dual Power Supply	£29.00

PRINTERS

Brother EP44	£228.00
Brother HR5	£148.00
Canon PW1080A 160 CPS (NLQ)	£325.00
Canon PW1156A 160 CPS (NLQ)	£430.00
Kaga KP810 (NLQ)	£289.00
Kaga KP910 (NLQ)	£399.00
Kaga RS232 + 2K buffer	£95.00
Ensign 1650 165 CPS	£305.00
Epson RX80T 100 CPS	£224.00
Epson RX80F/T 100 CPS	£240.00
MP-165 (NLQ)	£316.00
Panasonic KP1091	£325.00
Seikosha GP100A	£189.00
Epson RX100F/T 100 CPS	£396.00
Epson FX80 160 CPS	£370.00
Epson FX100F/T 160 CPS	£494.00
Shinwa CP80	£199.00
Riteman Compact 120 CPS	£199.00
Star Gemini 10X 120 CPS	£230.00
Star Gemini 15X 120 CPS	£339.00
Epson 8143RS232 Interface for FX & RX	£34.00
Epson 814RS232 Interface with 2K Buffer X On/Off	£65.00

DAISYWHEEL PRINTERS

Brother HR15	£378.00
Brother HR15 Keyboard	£155.00
Brother HR15 Sheet Feeder	£212.00
Brother HR15 Tractor Feed	£71.00
Quen Data 20 CPS	£249.00
Juki 6100 18 CPS	£340.00
Juki Single Sheet Feeder	£230.00
Juki tractor Unit	£115.00
Juki RS232 Interface	£74.00
Juki Spare Daisywheel	£16.00

COLOUR PRINTERS

Canon PJ1080A 7 Colour 40 CPS Ink Jet	£440.00
Seikosha GP700A 7 Colour 50 CPS	£399.00

DISKS

Very high quality Fuji
Diskettes, guaranteed for life
at only £20.00 per box
(Double-sided 80 track)

MODEMS

Pace Nightingale	£135.00
(inc Comstar ROM)	£155.00

WS2000

A world standard modem switchable between 75, 300/300, 600, 1200/75, 75/1200 baud rate. This is the only modem you would ever likely to need to communicate with any computer throughout the world.

Modem	£148.00
Lead	£7.50
Auto-Dial	£34.00
Auto-Dial Cable	£4.50
Auto-Answer Card	£34.00

Telemod 2

Switchable modem between 1200/75 and 1200/1200 baud rate that allows you to communicate with services like Micronet, Prestel, Easylink or with other computer users at 1200 baud rate.

Modem	£84.00
Lead	£5.00
Software	£19.95

Telemod 3

BT approved – switchable between 75, 300/300, 1200/75, 75/1200 and allows you to communicate virtually anywhere in the world. It will allow you to communicate with services like Micronet, Telecom Gold, Prestel, One-to-One, Easylink, Microweb. It comes as a standard with built in board for auto-answer.

Modem	£170.00
Lead	£8.00
Software	£19.95

BBC BUSINESS SOFTWARE

GEMINI

Cashbook Acc.	£95.00
Beebcalc	£19.95
Inv. + Statements	£19.95
Commercial Acc.	£19.95
Mailing List	£19.95
Database	£19.95
Stock Control	£19.95
Home Accounts	£19.95
Word Processor	£19.95

Please add £4.00 for Disc Version

ACORNSOFT

Invoicing Order Processing
Mailing List Purchasing
Stock Control Accounts Payable
Accounts Receivable
Price £23.95 each

WORD PROCESSING

BBC 1

BBC Mod. B, View of Wordwise, High Res. Monitor, Quen Data daisywheel printer, Cassette recorder with 10 cassettes and all the necessary cables and printer paper.

BBC 2

BBC Mod. B + DFS, View or Wordwise, 100K BBC drive, High Res. Monitor, QuenData daisywheel printer, 10 diskettes and all the necessary cables and paper
£883.00

BBC 3

Same as BBC 2 but with 400K drive £963.00

and Business computer users

BBC 4

BBC Mod. B + DFS, View or Wordwise, 800K Dual Disc Drive, High Res. Monitor, Juki 6100 daisywheel printer, 10 of 80 track Diskettes and all the necessary cables and printer paper	£1,275.00

ACCESSORIES

BBC Data Recorder	£35.00
DR6 Data Recorder	£25.00
Tornado Joysticks SW self-cen PR	£13.95
Quickshot + I/F for BBC	£19.95
Sureshot Joystick	£18.00
BBC Dust cover	£3.50
RH Light Pen	£44.00
Graph Pad	£115.00
BB Key Function key mask	£1.50
Disc storage box	£18.00
Disc storage box (80)	£24.00
Printer dust cover	£4.50
Monitor dust cover	£4.50
Listing Paper 9.5" x 11" (2,000 sheets)	£15.00
Data Cassette C15	£0.40

LEADS

Cassette Leads	£3.00
5 pin DIN to 6 pin DIN (RGB)	£3.00
Monochrome monitor lead	£3.25
Disc Drive power leads to BBC (single)	£4.50
(dual)	£5.00
Disc Drive Ribbon Cable (single)	£8.00
(dual)	£10.00

RAVEN-20
RAVEN 20

EXPANSION BOARDS

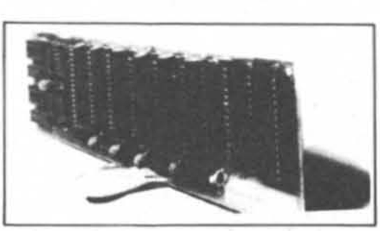
RAVEN-20 BOARD

The RAVEN-20 is a 20K RAM EXPANSION for the BBC Micro, Model B, fitted with O.S. 1.2.

This specially designed product plugs in to the CPU socket of your micro (centre socket of the 3 available) with the minimum of effort. The pins are specially custom made, thus avoiding any possible damage to the circuitry.

The RAVEN board provides the user with an extra 20K of usable RAM in screen modes 0 to 3. This together with the aid of software makes the system completely transparent to both the user and the computer.

The RAVEN-20 software ROM gives much more than just the standard commands, it has been programmed to give more and better commands! Priced at £69.95 inclusive of VAT. Please add £1.50 for post and packing.



RAM-ROM BOARD

The RAM-ROM extension board gives an extra 6 sockets for extra ROM's and 2 slots of RAM. This RAM is not an extension of BASIC. It is intended that the RAM be used to develop your own ROM based software. There are in fact seven sockets on the board, the 7th replaces the socket on the main board that would otherwise be taken by the ROM board. (The RAM-ROM board can accommodate both 2764 type EPROMS as well as 27128 EPROMS and ROM).

The RAMAMP board will not cause overheating. It comes with fully fitting instructions, tested and heat tested before despatch.

Prices: 1 x 16K RAM fitted £55.00. 2 x 16K RAM fitted £65.00.

BOOKS

30 Hour BASIC (BBC Micro)	£6.95
35 Educational Programs for BBC	£6.95
36 Challenging Games for BBC	£5.95
40 Educational Programs for BBC	£5.95
100 Programs for BBC Micro	£6.95
Cassette version of above	£10.00
6502 Application Book	£11.95
6502 Assembly Language program	£13.95
6502 Assembly Language Subroutines	£14.25
6502 Machine Code for Beginners	£5.95
6502 Machine Code for Humans	£7.95
6502 Software Design	£10.50
A young persons guide to BBC Basic	£4.50
A Beginners guide to LISP	£10.95
Advanced Machine Code Technique for BBC	£7.95
Advanced User Guide for BBC Micro	£11.95
Advanced Graphics with BBC	£9.95
Advanced 6502 Programming	£12.45
Assembly Language Programming on BBC Micro	£7.95
Advanced Programming Techniques for the BBC Micro	£7.95
BBC Basic	£7.95
Assembly Lang. Prog. on BBC	£7.40
BBC BASIC	£5.95
BBC Computer Magic	£5.50
BBC DIY Robotics & Sensors	£6.95
BBC Forth	£7.50
BBC Lisp	£7.50
BBC Micro An Expert Guide	£6.95
BBC Micro Book BASIC Sound & Graphics	£7.95
BBC Micro Graphics and Sound	£6.95
BBC Micro Programs in Basic	£5.95
BBC Micro Revealed	£6.95
BBC Micro Assembly Lang. Prog.	£7.95
BBC Micro Disc Companion	£7.95
BBC Micro in Education	£6.50
Basic programming on BBC Micro	£5.95
CP/M The software BUS	£8.95
CP/M Users Guide	£13.95
Creating Adventure Programs on BBC Micros	£6.95
Creative Graphics Cassette Acornsoft). Has 36 graphics programs	£8.95
Creative Graphics on BBC Micro	£7.50
Complete Programmer for BBC	£5.95
Discover BBC Machine Code	£6.95
Discover FORTH	£13.95
DIY Robotics & Sensors with BBC	£6.95
Exploring FORTH	£6.95
Further Prog. for BBC Micro	£5.95
FORTH Programming	£14.40
Functional Forth for the BBC Micro	£5.95
Games on your BBC Micro	£2.95
Games BBC Compuer Can Play	£6.95
Getting more from your BBC & Electron	£6.95
Graphs & Charts on BBC Micro	£7.50
Graphic Art for BBC Computer	£5.95
Graphs and Charts (Cassette)	£7.50
Introducing the BBC Micro	£5.95
Introduction to FORTH	£9.30
Interfacing projects for the BBC Micro	£6.95
Introducing LOGO	£5.95
Lt your BBC teach u to program	£6.45
LISP	£9.25
Logo Programming	£8.95
Mastering CP/M	£13.65
Programming the 6502	£11.95
Programming the Z80	£14.25
PASCAL	£9.25
Structured Prog. with BBC BASIC	£6.50
The Complete FORTH	£6.95
Using Floppy Discs with BBC Micro	£5.95
Using BBC Basic	£6.95
Using 6502 Ass. Language	£14.50
Wordstar & CP/M made easy	£6.95

BEST SELLERS

Frak (Aardvark)	£8.95
Micro Olympics (Database)	£5.95
Chuckie Egg (A'n'F)	£7.00
Fortress (Pace)	£7.95
Contract Bridge (Alligata)	£5.35
Mini Office (Database)	£5.95
747 Flight Simulator (Dr Soft)	£7.15
Elite (Acornsoft)	£14.95

All prices inclusive of VAT. Please add £1.50 for P&P.

HOW TO ORDER

You may purchase any of the items listed by cheque made payable to: Twillstar Computers Ltd. Barclaycard or Access. All you have to do is fill in your requirements on a separate sheet of paper, post to us and we will despatch with 24 hours, subject to availability. All prices inclusive of 15% VAT. ADD £2.50 P&P for orders below £150. Over add £8 P&P. Credit card holders may order by telephone. Give card number, name, address and items required. Please note VAT is not charged on export orders. Export customers please ring for details of P&P.

TCL

TELEPHONE ORDERS
(01) 574 5271

Open
6 days a week
9am to 7pm
Monday to Saturday

BARCLAYCARD VISA

Twillstar Computers Limited

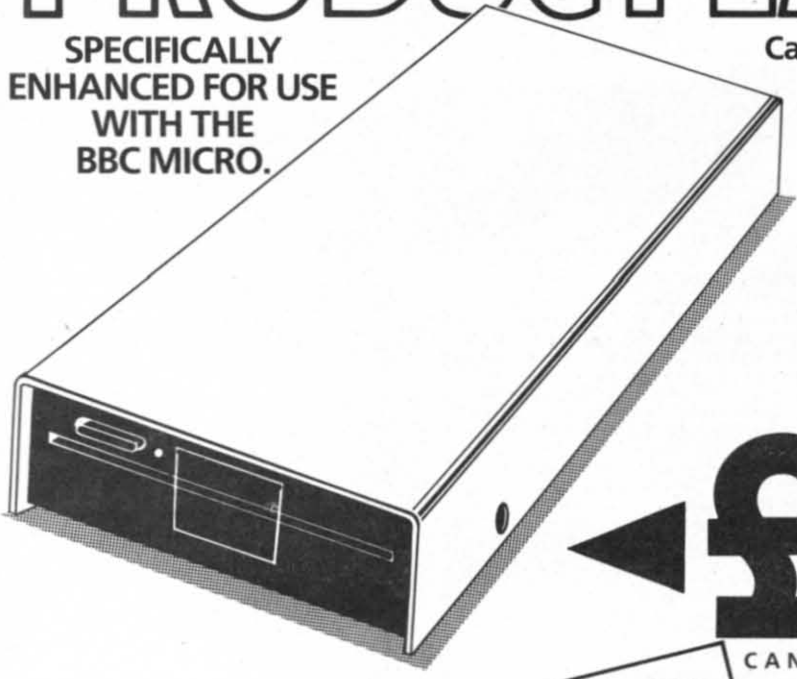
17 Regina Road, Southall, MIDDLESEX, UB2 5PL. TEL: (01) 574 5271

EMS

CHASE DATA

NEW

PRODUCT LAUNCH



SPECIFICALLY ENHANCED FOR USE WITH THE BBC MICRO.

Canon 221A "Super-Slim" (33.5mm) 80 track double sided 400K floppy disc drive (40/80 track switching).

Continuing our policy of securing premium quality products at budget prices we are pleased to announce the new generation Canon 221A drive.

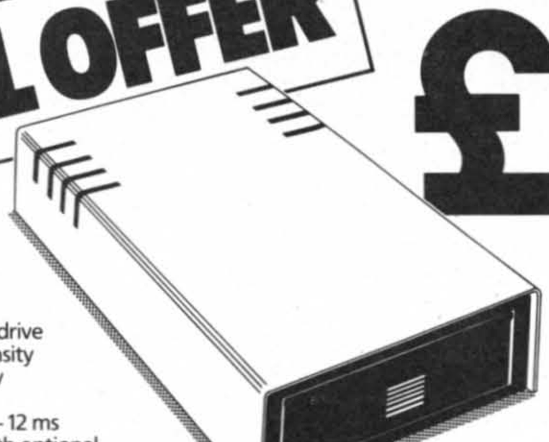
Specifications:
80 track double sided disc drive. 40/80 track switching with dual colour LED. Capacity 400K in single density, operates in double density. Direct drive, track to track access 3 ms in 96 TPI mode. Dimensions:– 1/3 standard height, only 33.5mm.

£154 INC.

CANON 6108 2/3 HEIGHT (57.5mm)
40 TRACK D/SIDED 200K
FLOPPY DISK DRIVE

SPECIAL OFFER

£75 INC.



Specifications:
40 track double sided disc drive
capacity 200k in single density
Operates in double density
Belt driven
Track to track access time – 12 ms
Full 12 month warranty with optional extended warranty available

Price Includes:
Drive cased with cables, manual & utilities disc and includes VAT, postage & packing.

All canon 40/80 switchable disc drives feature an on-board dual-colour LED on the front panel to show track mode selected. This is coupled with our own unique two-stage illumination. To give a clear operating status, as follows.

40 TRACK MODE: ____ LED GREEN
80 TRACK MODE: ____ LED RED
POWER ON: ____ HALF-ILLUMINATION *(GREEN OR RED)*
DRIVE SELECTED: ____ FULL-ILLUMINATION *(GREEN OR RED)*

FUJI FLOPPY DISCS

	Per box 10	If purchased with disc drive
40 TK SS DD	**£17.60**	**£15.60**
40 TK DS DD	**£24.50**	**£22.50**
80 TK DS DD	**£28.60**	**£26.60**

These prices include VAT & P & P.

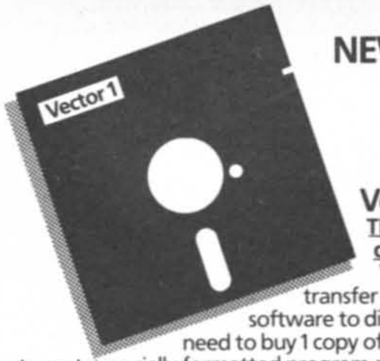
DISCUS

Test utility for testing your own disc drive, at regular intervals to avoid the dreaded flop of your floppy. Menu driven, easy to use, 40 or 80 track versions.

Tests: Motor speed, read/write, steptest, alignment test*, step & read/write test, read only test.

£8.00 inc. **£7.00** if purchased with disc drive.

*This test requires and oscilloscope & alignment disc.



NEW SOFTWARE RELEASE FROM CHASE DATA

Vector 1 –

The ultimate tape to disk utility

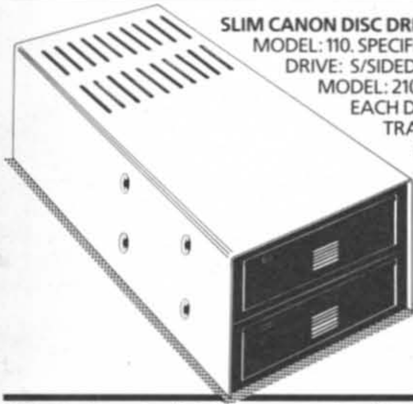
Vector 1 allows you to transfer almost all your tape software to disk. Unlike others, you only need to buy 1 copy of Vector 1 since it transfers tapes to specially formatted program discs. This is easily the most powerful tape to disk utility available.

Vector 2 –

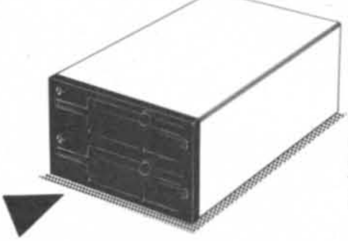
Disk to disk utility

Vector 2 allows you to make backup copies of all your valuable disk software. It is the most advanced utility of its kind available. It is a condition of sale that neither of these products are used for infringement of copyright.
Not compatible with double density interface.

Vector 1	**£16**	On its own
	£15	If purchased with disk drive
Vector 2	**£16**	On its own
	£15	If purchased with disk drive



SLIM CANON DISC DRIVES:
MODEL: 110. SPECIFICATION OF EACH DRIVE: S/SIDED 40 TRACK 100K. MODEL: 210. SPECIFICATION OF EACH DRIVE: D/SIDED 40 TRACK 200K. MODEL: 220. D/SIDED 80 TRACK 400K. **(40/80 TRACK SWITCHING)**



SLIM SANYO DISC DRIVES:
MODEL: 596D. SPECIFICATION OF EACH DRIVE: D/SIDED 40/80 TRACK 400K.
(40/80 TRACK SWITCHING)

The Sanyo disc drive is a "half-height" 40/80 track switchable unit of standard dimensions, built to Sanyo's usual high standards of quality and reliability.

All inclusive price list: This means: disc drive + case + all power & data cables + UK carriage + utilities disc & manual + VAT.

	CANON					SANYO
Model	**110**	**6108**	**210**	**220**	**221A**	**596D**
Formatted Capacity per drive on BBC Micro:	100K	200K	200K	400K	400K	**400K**
Single Drive & Case:	£85	£75	£99	£149	£154	**£149**
Single Drive & Case PSU:	£110	–	£124	£174	£179	**–**
Dual Drive & Case:	£174	–	£199	£279	£289	**£279**
Dual Drive & Case/PSU:	£204	–	£234	£309	£319	**£309**

DON'T FORGET YOUR VECTOR 1 & 2 WHEN ORDERING.

Support:
Warranty: All disc drives sold by Chase Data Ltd come with a full one-year warranty on parts & labour with optional extended warranty on all drives.
If you have bought a disc drive from Chase Data during the last 12 months why not consider an extended warranty contract.
£25 2nd year warranty. £40 2nd & 3rd year warranty.
Non-Warranty Service: As the experts in our field, we can offer service on most makes of floppy disc drive.
Recalibration & Alignment … **£25** per unit inc. VAT (parts extra).
Phone for details: **(Tel: 0784-38487).**

Payment:
By Post: Send your remittance (cheques only please) with your order to:

CHASE DATA

Unit 2, Crabtree Road, Thorpe Industrial Estate,
Egham, Surrey, TW20 8RN.

By Phone: **(Tel: 0784-38487).** Allow up to 21 days for delivery.

L.B. ELECTRONICS

SPEECH SYNTHESISER kit as in March/April Electronics & Computing kit £24.95 p&p £1.50. Ready built £34.95 p&p £1.50 for details send a S.A.E.

LYNX 48K colour computer, new and boxed £100 + VAT, carriage £6.

PRESTEL MONITORS 6" green phosphor screen, 12 digit keyboard, printer port, cassette port, keyboard port (for full qwerty keyboard) brand new and boxed special offer £99.95 + VAT.

DISC DRIVE BONANZA SANYO 5¼" half height D.S.D.D. 80 track/40 track, £165 + VAT. £8 carriage.

TWIN 5¼ INCH DISK DRIVE CABINETS with built-in P.S.U. £40 + VAT (will take one by full height for 2 by ½ height).

DOUBLE DENSITY INTERFACE FOR MODEL B BBC adaptor P.C.B. plugs into 8271 socket to give full double density will run 5¼" drives 3" drives 8" drives, £110 + VAT for full documentation send a S.A.E.

KEYBOARD BONANZA. Brand new ASCII coded single 5 volt rail data, £29.95 p&p £1.50, for leaflets send a S.A.E.

Our business has now expanded and we have computer showrooms at Micro House, 416 Derby Road, Greenford, Middx. Many computer peripheral bargains on show. We now stock the new SANYO MBC 555, £999 + VAT (twin drive 128K standard ram expandable to 256K complete with £1,000 of software ie word star, spell star, mail merge, report star, etc, full demonstrations available, phone for appointment for full details send a S.A.E.
New monitors, printers, disk drives, diskettes, paper, ribbons, etc, etc supplied at realistic prices please note our retail component shop is still in operation at Hercies Road.

ACCESS **L.B. Electronics** VISA
11 Hercies Road, Hillingdon
Middlesex UB10 9LS
Telephone: 0895 55399

HORNBY SOFTWARE

Britain's top
Spectrum Pro-Golf Series
now available for the first
time on BBC
Model B 1.2 O.S.

The real thing, exact simulation of Britain's top golf courses.

1. All golf rules apply.
2. Designed for one or two players.
3. Played off any handicap.
4. On each hole, distance, par, green enlargement.
5. Control shot – choice of all clubs, strength, direction.
6. Graphics excellent.
7. Extremely realistic.

TROON £7.75 NEWBIRKDALE £7.75
WENTWORTH EAST & WEST COURSE £11.00
Latest Programme
MOORTOWN PRO-TOURNAMENT
COURSE 1984 £7.75
ALSO SPECIAL OFFER
FULL SERIES £28

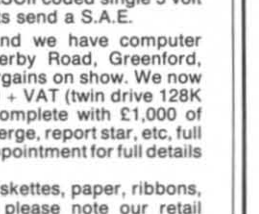
All prices include VAT & P&P
Available from:
HORNBY SOFTWARE
21 Pinfold Hill, Leeds LS15 0PW.
Telephone: 0937 65847

Professional Software

CONTEX

Fast delivery for the BBC Computer

THE CONTEX SPREADSHEET



must be the most versatile spreadsheet program available for your BBC computer. It will process virtually any financial or statistical column/row analysis calculations. Prepare your home and office budgets, process accounts, complicated invoices, job costing, financial modelling, expense evaluations, foreign exchange, record stocks and shares, fixed assets etc.

Over 1,000 cells in upto 26 columns and 99 rows. Data, formulae or text in any cell. Individually variable column widths (1-30 chrs) and decimal places per column. Nine digit accuracy. Various printer formats. Row and column insert and delete with auto formulae adjust. Use any BBC function, eg LOG, SIN, SQR. Many new functions, eg MAX, MIN, SUM DISCOUNT. Replicate formulae and data with auto adjust. Variables. Colour. Four way scrolling while headings stay on screen. Edit. Search. Help. Limits. Access to OS/DFS commands, eg *DISC. Modify. Reference cells by id, eg al, or its headings, eg :JAN:GAS: Full instruction booklet with tutorial, reference and examples.

Cassette £9.99 inc.

MK IV SPREADSHEET

Using advanced disc overlaying techniques Contex has now considerably enhanced the disc version of SPREADSHEET with more than 30 significant extra facilities. In addition to all the features in the standard version the Mk IV includes:
Complete format control, set text and data left or right justified and decimal places globally, by column and/or right down to individual cell settings. Programmable scripted input. Programmable printed output. Sort by column or any section of a column. Merge selected portions of models. Ascii file input from own program or WP. Dynamic calculator using interactive input, existing formulae or data and functions. View formulae in model. More functions. Spool output for WP. Brand new manual. And more! Mk IV will handle models in excess of 1,000 cells (even upto 1,400 cells at a push).

Mk IV Spreadsheet (available on disc only) £14.99 inc.
Existing users may upgrade; return original cassette for disc £7.99 inc.
Return original disc £5.99 inc.

TYPING TUTOR

- Learn to touch type quickly
- Over 90 smoothly graded lessons
- Intelligent line check/word scan system
- Recommended by Adult Educational Authorities
- Optional clock, audio key click, metronomic pacing, revise targets
- Optionally insert own lessons for specific training (eg foreign language)

Cassette £9.99 inc.
Disc £11.99 inc.

Post to: **CONTEX COMPUTING, 15 Woodlands Close, Cople, Bedford MK44 3UE.**
Please send me TYPING TUTOR/SPREADSHEET* on CASSETTE/DISC 40 TRACK/DISC 80 TRACK*
Enclosed cheque/P.O. for £__________ (overseas add £2.00) Payable to CONTEX COMPUTING.

Name ....
Address ....
....
* *delete as appropriate.*

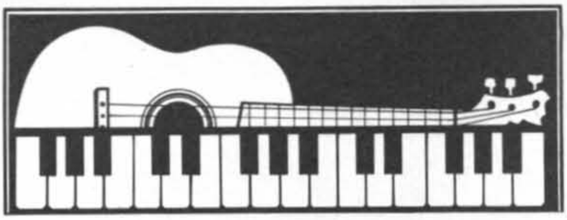
MU3

Catacastles listing

From Page 73

```
  920 VDU31,5,15,160,31,4,16,160,160,
160,31,4,17,160,160,160,160,31,5,18,1
60,160,160,160
  930 GOTO950
  940 VDU31,35,15,160,31,34,16,160,16
0,160,31,33,17,160,160,160,160,31,32,
18,160,160,160,160
  950 ENDPROC
  960 DEFPROCcastle(X)
  970 VDU31,X-1,15,147,255,160,255,16
0,255,31,X-1,16,147,255,255,255,255,2
55,31,X,17,147,255,255,255,31,X,17,14
7,255,255,255,31,X,17,147,255,255,255
  980 VDU31,X,18,147,255,255,255,31,X
,19,147,255,255,255,31,X,20,147,255,2
55,255
  990 ENDPROC
 1000 DEFPROCptero(D,T,X)
 1010 ON D+T+1 GOTO 1020,1040,1060,10
80
 1020 VDU31,X,3,176,254,176,31,X,4,16
2,171,161
 1030 GOTO1090
 1040 VDU31,X,3,160,240,240,160,31,X,
4,162,170,183,160
 1050 GOTO1090
 1060 VDU31,X,3,224,253,224,31,X,4,16
2,167,161
 1070 GOTO1090
 1080 VDU31,X-1,3,160,240,240,160,31,
X-1,4,160,235,165,161
 1090 ENDPROC
 1100 DEFPROCtitle
 1110 PRINTTAB(9,0);CHR$(141);CHR$(13
0);"CATACASTLES";CHR$(140);CHR$(129);
"by";CHR$(134);"Thomas Evans"
 1120 PRINTTAB(9);CHR$(141);CHR$(133)
;"CATACASTLES"'
 1130 ENDPROC
 1140 DEF FNMAN(Z%)
 1150 IFZ%=1 K%=-1 ELSE K%=1
 1160 =K%
 1170 DEFPROCfire
 1180 SOUND1,1,6,9
 1190 OG%(Z%)=0
 1200 A(1,Z%)=20+FNMAN(Z%)*14:A(2,Z%)
=15
 1210 A(3,Z%)=SIN(AN(Z%))
 1220 A(4,Z%)=COS(AN(Z%))
 1230 PROCcata(Z%,1)
 1240 C%(Z%)=1:IF Z%=1 P%(Z%)=160 ELS
E P%(Z%)=150
 1250 IFZ%=1 VDU31,3,18 ELSE VDU31,37
,18
 1260 VDU160
 1270 ENDPROC
 1280 DEF FNPOINT(U%,V%)
 1290 VDU31,U%,V%
 1300 B%=(USR &FFF4 AND &FF00) DIV256
 OR 128
 1310 =B%
 1320 DEFPROCbullet(X,Y)
 1330 VDU31,INT(X),INT(Y)
 1340 VDU 160+B%(INT((X-INT(X))*2),IN
T((Y-INT(Y))*3))
 1350 ENDPROC
 1360 DEFPROCterain(Z%)
 1370 C%(Z%)=C%(Z%) AND 254
 1380 IF (C%(Z%) AND 2)=0 PROCcatacl(
Z%):PROCcata(Z%,0)
 1390 IF Z%=1 AN(1)=1.6 ELSE AN(2)=4.
7
 1400 ENDPROC
 1410 DEFPROChit
 1420 IFINT(A(1,1))=INT(A(1,2)) AND I
NT(A(2,1))=INT(A(2,2)) PROCterain(1):
PROCterain(2):VDU31,INT(A(1,1)),INT(A
(2,1)),160:SOUND1,-13,40,3:GOTO1490
 1430 IF A(2,Z%)<5 D%=(Z%-1.5)*-2:C%(
Z%)=C%(Z%) OR 4:TR%=1:C%(3-Z%)=C%(3-Z
%) AND 251:SOUND0,2,29,10:GOTO 1480
 1440 NO=ABS(INT(A(1,Z%))-20):ZZ%=(SG
N(A(1,Z%)-21)+1)/2+1
 1450 IFNO>=18 PROCsulk(ZZ%):GOTO1480
 1460 IFNO>=12 PROCdud(ZZ%):GOTO1480
 1470 IFNO>=7 PROCbull(ZZ%,Z%)
 1480 PROCterain(Z%)
 1490 ENDPROC
 1500 DEFPROCsulk(Z%)
 1510 SOUND1,3,2,20
 1520 IFZ%=1 PROCman(0,2):VDU31,3,18,
160 ELSE PROCman(37,1)
 1530 C%(Z%)=C%(Z%) OR 2:IF KO%(Z%)=0
 KO%(Z%)=95
 1540 ENDPROC
 1550 DEFPROCdud(ZZ%)
 1560 SOUND1,3,2,20
 1570 PROCcatacl(ZZ%)
 1580 C%(ZZ%)=C%(ZZ%) OR 2:IF KO%(ZZ%
)=0 KO%(ZZ%)=70
 1590 ENDPROC
 1600 DEFPROCbull(ZZ%,Z%)
 1610 SOUND0,4,6,4
 1620 DA%(ZZ%)=DA%(ZZ%)-1
 1630 HI=A(2,Z%)
 1640 REPEAT
 1650 HI=HI-1
 1660 UNTIL FNPOINT(A(1,Z%),HI)<>255
 1670 VDU31,A(1,Z%),HI+1,160
 1680 IF DA%(ZZ%)<1 Z%=3-ZZ%:GOTO 192
0
 1690 ENDPROC
 1700 DEFPROCinstruct
 1710 PRINTTAB(0,3);"  The two barons
,each controlled by a"
 1720 PRINT"player,are trying to knoc
k down each"
 1730 PRINT"others castles,by using:"
 1740 PRINT"     Left player      Righ
t player"
 1750 PRINT"     SHIFT LOCK  and COPY
"
 1760 PRINT"to fire.The longer the ke
y is held down"
 1770 PRINT"before releasing,so the g
reater the "
 1780 PRINT"angle of fire.Releasing t
he key lets"
 1790 PRINT"loose your boulder."'
 1800 PRINT"  ANY KEY TO CONTINUE INS
TRUCTIONS":G=GET
 1810 PRINTTAB(0,3);"  If it hits the
 castle,it will partly "
 1820 PRINT"crumble - the winner bein
g the one with"
 1830 PRINT"some castle left.
               "
 1840 PRINT"  Hit a man and he will s
ulk for a      "
 1850 PRINT"time,whilst a hit catapau
lt takes a     "
 1860 PRINT"little less time to repai
r.             "
 1870 PRINT"  Hit the bird,and he wil
l drop your    "
 1880 PRINT"boulder when you say,so l
ong as you     "
 1890 PRINT"were last to hit him.Use
your fire key."'
 1900 PRINT"ANY KEY TO START:        HA
PPY SHOOTING  ":G=GET
 1910 ENDPROC
 1920 PRINTTAB(13,6);CHR$(130);CHR$(1
41);"THE WINNER"
 1930 PRINTTAB(13,7);CHR$(133);CHR$(1
41);"THE WINNER"
 1940 ONZ% GOTO 1950,1970
 1950 VDU31,12,8,145,255,31,11,9,145,
248,255,255,31,9,10,145,245,232,255,1
83,31,9,11,145,255,255,167,31,9,12,14
5,255,255,244
 1960 GOTO1980
 1970 VDU31,25,8,145,255,31,24,9,145,
255,255,244,31,25,10,145,235,255,180,
250,31,26,11,145,171,255,255,31,26,12
,145,248,255,255
 1980 *FX15,0
 1990 FORT=1TO3:SOUND1,-15,101,3:SOUN
D1,-15,117,3:NEXT:SOUND1,-15,101,7
 2000 PRINTTAB(11,24);"ANOTHER GAME?"
;
 2010 G$=GET$:IF G$<>"N" AND G$<>"n"
THEN RUN ELSE GOTO 2010
```

This listing is included in this month's cassette tape offer. See order form on Page 189.



CHORD TUTORS

COMPUTER PROGRAMS

BBC–A/B (32K) ELECTRON SPECTRUM (48K)
DISPLAY CHORD SHAPES FOR GUITAR FINGER POSITIONS FOR KEYBOARDS

GUITAR CHORD TUTOR

★ Displays 144 chord shapes with finger positions, silent strings, and barres.
★ Large display suitable for group teaching and individual practice.
★ Chord progressions in memory.
★ Replay memory.
★ Sound ON/OFF to play chord notes.
★ Tuning notes for open strings.

KEYBOARD CHORD TUTOR

★ Displays finger positions for 144 chords and their inversions.
★ Displays major and minor scales.
★ All the features of the GUITAR CHORD TUTOR except tuning notes.

£14.95 each including postage & packing. Cassette only, transferable to disc.

State clearly GUITAR or KEYBOARD and Microcomputer

Order direct from:
P.R. ADBY ASSOCIATES LTD
40 BROAD STREET, SEAFORD, E. SUSSEX BN25 1NF

ACCESS – BARCLAYCARD Orders – Telephone 0323 899202

JP Magnetics

specialists in the supply of bulk custom wound audio/computer cassettes to Trade and Education

NEW! TURBO LOAD FOR CBM 64 WITH 'ON SCREEN DISPLAY'

DUPLICATION FACILITIES FOR
MOST POPULAR HOME COMPUTERS
16 TRACK RECORDING STUDIO

Competitive Rates, Contact us for price list/quotations now.

JP MAGNETICS LTD
UNIT 4, 7 MARY ST, BRADFORD BD4 8SW
TEL: (0274) 731651

ALL IN STOCK

S.P. ELECTRONICS

BBC SPECIALISTS

Acorn Electron	£199.00
BBC Model B 1.2 O.S.	£399.00
CP80 Printer (inc. cable)	£229.00
Disc Operating System	£96.00
Disc Drives	from £175.00
Disc Operating System D-Density	£104.00
G3 WHO RTTY PROGRAM (TAPE)	£7.50
G3 WHO RTTY PROGRAM (EPROM VERSION)	£20.00
Circuit board for RTTY decoder Mk.3 (inc. instructions)	£7.00
Star 10X Printer (inc. cable)	£275.00
CANNON Dot Matrix 160cps NLQ	£350.00
Joysticks (pair) self centering + analogue	from £17.95
Printer Cable (Centronics)	£12.90
Speech Synthesis	£55.00
Disc Doctor	£33.00
WORDWISE Word Processor	£39.00
Slow Scan TV Circuit Board + Program (inc. instructions)	£17.50

Wide selection of software, books, leads, plugs, etc.
SAE for full list. All available Mail Order

All prices apply while stocks last.

48 Linby Road, Hucknall,
Notts. NG15 7TS.
Tel: 0602 640377

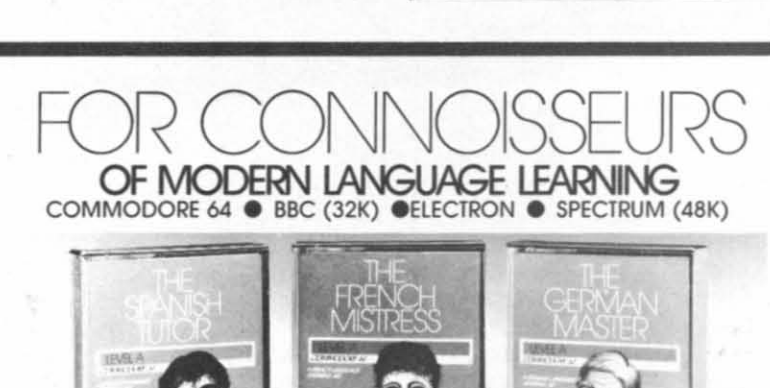
(all prices include VAT)

Carriage extra

FOR CONNOISSEURS

OF MODERN LANGUAGE LEARNING

COMMODORE 64 ● BBC (32K) ● ELECTRON ● SPECTRUM (48K)



Dealers, contact Lightning, Proteus, Centresoft, Microdeal or Tiger.

All titles are immediately available from good computer stores or by 24-hour mail order. Price £8.95 (overseas orders add £1)

For beginners, O-level and beyond, these best-selling programs are unique and highly successful aids to language learning. Each cassette provides a comprehensive series of vocabulary lessons and a variety of self-paced learning and test modes. All accents and special characters are clearly displayed and different colours denote masculine, feminine and neuter words to reinforce gender learning.

The create command enables new lessons in vocabulary or grammar to be entered, edited as required, then saved on tape. By using this simple yet vital feature, homework lists and exam revision can be retained indefinitely and recalled on demand.

Two cassettes are available for each language, covering thousands of words; Level A provides 16 lessons in general vocabulary; Level B provides a further 16 lessons including adjectives, adverbs and fully conjugated verb lists.

KOSMOS
S·O·F·T·W·A·R·E

KOSMOS SOFTWARE LTD 1 Pilgrims Close, Harlington, DUNSTABLE, Beds. LU5 6LX Tel: (05255) 3942

The French Mistress	Level A @ £8.95	☐	The French Mistress	Level B @ £8.95	☐
The German Master	Level A @ £8.95	☐	The German Master	Level B @ £8.95	☐
The Spanish Tutor	Level A @ £8.95	☐	The Spanish Tutor	Level B @ £8.95	☐

KOSMOS SOFTWARE LTD.
1 Pilgrims Close, Harlington, DUNSTABLE, Beds. LU5 6LX.

Computer type ....(Commodore 64/BBC/Electron/Spectrum)
Mr/Mrs/Miss ....
Address ....
....
..............................Postcode ....

From Page 103

VARIABLES

B(39,29)	Screen display.
A$(8)	Rotations for ship.
SC	Latest score.
HS	High score.
FUEL	Amount of energy remaining.
STA	Start variable: Prevents arrays from being re-dimensionised.
X%	X coordinate of ship.
Y%	Y coordinate of ship.
X and Y	Mask variables for the above two coordinates. Also used for x and y coordinates in the teletext print routine.
Q%	Horizontal movement component.
W%	Vertical movement component.
Q% and W%	Masks for the above pair.
A	Total number of planets.
AA1	Number of planets mined in the present galaxy.
GAL	Present galaxy number.
A$	Last key pressed.
GX	X coordinate of alien.
GY	Y coordinate of alien.
G1	Horizontal component of movement for alien.
G2	Vertical component.
G$(2)	The two forms of the alien craft printed sequencially thus achieving animation.
T	The counter for the above variable.
L	Whether there is currently a torpedo in motion.
SF	Sine value of FUEL.
CS	Cosine value of FUEL.
X1-4	X coordinates for explosion components.
Y1-4	Y coordinates.
D$	String to be printed by the teletext procedure.

PROCEDURES

INTRO	Prints up the title screen.
INIT	Sets up all variables and envelopes.
USR	Defines the graphics characters.
SCRN	Draws the game screen and console.
GAUGE	Updates the fuel display.
SC	Updates the score.
END	The end game procedure which blows up the starship.
GAL	Changes galaxy when all the planets have been mined.
TELETEXT	Prints text in the middle of the screen so as to produce an attractive screen display while displaying the initial screen or instructions.

```
   10 REM ASTRO-MINES
   20 REM (C) The Micro User
   30 SC=0:HS=0:STA=0
   40 MODE7
   50 VDU23;8202;0;0;0;
   60 ONERRORMODE7:REPORT:PRINTERL:EN
D
   70 PROCUSR:PROCINIT:PROCINTRO
   80 MODE4:FUEL=7.9:A=5:AA1=0:PROCSC
RN
   90 VDU23;8202;0;0;0;:CT=1
  100 VD=INT(RND(3)-1):IFVD=2 VD=4:VD
U19,0,VD,0,0,0:ELSEVDU19,0,VD,0,0,0
  110 PROCGUAGE
  120 PROCSC
  130 IFASCA$=13THENL=1:X=X%:Y=Y%:Q=Q
%:W=W%:SOUND0,1,-10,1:FORN=1TO1000:PR
INTTAB(X,Y);CHR$(241)
  140 PRINTTAB(X%,Y%);A$(R%);TAB(26,2
6);A$(R%):JK=JK+1
  150 IFJK/31 =INT(JK/31)THENPROCGUAG
E
  160 IFFUEL=1.53299997THENPROCEND:MO
DE7:VDU23;8202;0;0;0;:PROCINTRO:GOTO8
0
  170 Q%=Q%(R%):W%=W%(R%)
  180 IFX%=0ANDQ%=-1THENQ%=0
  190 IFX%=39ANDQ%=1THENQ%=0
  200 IFY%=20ANDW%=1THENW%=0
  210 IFY%=1ANDW%=-1THENW%=0
  220 IFB(X%+Q%,Y%+W%)=1THEN VDU5:MOV
E670,175:PRINTCHR$(238):VDU4:ELSEGCOL
0,0:VDU5:MOVE670,175:PRINTCHR$(238):V
DU4:GCOL0,1
  230 IFB(X%,Y%)=2THENVDU19,0,VD+RND(
4),0,0,0:VDU19,1,1,0,0,0:SC=SC+10:PRO
CSC:SOUND1,3,50,1:AA1=AA1+1:PRINTTAB(
8,24);AA1:B(X%,Y%)=0:FORC=1TO100:NEXT
C:VDU19,1,7,0,0,0:VDU19,0,VD,0,0,0:IF
AA1=A THENPROCGAL:AA1=0:VDU4
  240 IFB(X%,Y%)=1THENPROCEND:MODE7:V
DU23;8202;0;0;0;:PROCINTRO:GOTO80
  250 A$=INKEY$(0)
  260 IFA$="Z"THENR%=R%-1:IFR%=0THENR
%=8
  270 IFA$="X"THENR%=R%+1:IFR%=9THENR
%=1
  280 IFG=1THEN310
  290 J=INT(RND(200)):IFJ=1THENG=1:GX
=INT(RND(39)):GY=INT(RND(20)):GOTO420

  300 GOTO500
  310 PRINTTAB(GX,GY);" ":B(GX,GY)=1
  320 SOUND1,3,100,1
  330 IFGX<X%THENG1=1
```

→

STRIPPER II

The professional tape back-up copier for the BBC/Electron, the best around!

This copier, which has been selling for over a year for use on the BBC, is updated regularly to ensure you can make security back-ups of all your own commercial software.

As Stripper II is so good we must insist on personal use only, please.

Copes admirably with locking, false addresses, control code filenames, long programs, in fact any protection you will find on your latest software releases. It even lets you put locking protection on your own programs.

New low price, just **£3.95** cheque or P.O. to receive Stripper II by return post. Educational orders welcome.

FREE OFFER – when Stripper III is released, owners of Stipper II can return the voucher sent to them and get the new version absolutely free!

THE 'ENFORCER'

The professional **disc** protector – gives your disc based programs and files **password protection**!

Everyone has some programs or data they wish to protect from prying eyes or fingers:-

Your Wordwise/View files, your latest software creation, your personal/business accounts or maybe you have just had enough of your children accidentally deleting your favourite games disc!

Cypher enables you to give all your discs **highly secure** password protection by encoding the whole disc with a password of your choice and a very clever mathematical algorithm.

Access to any of the programs or data on the disc is impossible without the original password. You can even use more than one password.

Very simple to use.

Special introductory low price – just **£3.95** inclusive.
Educational orders welcome.

Orders to:
Aggressive Software, 14 Elmore Road,
Sheffield S10 1BY

COMPUCHESS

Proudly presents

CHESS ANALYSIS SYSTEM (CAS)

CHESS DATABASE for the BBC Model B (OS 1.2)

- EASY TO USE structured database.
- MOVES, VARIATIONS AND COMMENTS in a file.
- ANY NUMBER OF GAMES in a file.
- START GAMES from any position.
- UPTO 2000 MOVES in a file.
- EDITOR to update files.
- AUTOMATIC game index.
- SAVE to tape or disk.
- **MANY REPLAY OPTIONS** include: AUTOMATIC RESET to selected position; JUMP backwards and forwards in a game; TEST YOURSELF against the data file.
- LARGE DISPLAY of board and pieces showing current position.
- **You can use CAS to:** BUILD AND UPDATE your personal opening system; RECORD AND ANALYSE games including POSTAL CHESS games with dates; ANALYSE POSITIONS, e.g. analyse variations on adjourned games.

In addition Compuchess provides data files containing instructional and reference material for use with CAS. Many more will follow.

CHESS AUTHORS We are seeking chess material suitable for publication in data files.

ALL GOODS DESPATCHED WITHIN 5 WORKING DAYS. PLEASE SEND ORDER & CHEQUE/P.O. TO **COMPUCHESS, Horndale Avenue, Aycliffe Industrial Estate, Co. Durham DL5 6DR. Tel: (091) 2854325.** Educational & dealer enquiries welcome.
VAT No. 257 8710 30.

Name ______________________ *Cheque/P.O. for* ____________

Address ______________________________________

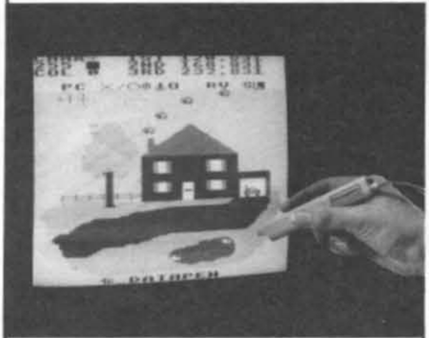
______________________ *Post code* ______________________

Please tick boxes as appropriate
CHESS ANALYSIS SYSTEM 40 track disk ☐ £11.95 80 track disk ☐ £11.95
CHESS ANALYSIS SYSTEM Tape version ☐ £9.95
TAPE TO DISK UPGRADE Send old tape £5.00 **PRINTER DUMP** ☐ £4.50
DATA FILES: Benoni ☐ **French** ☐
Queens Gambit Declined ☐ **Queens Indian** ☐
Kings Indian ☐ **Grunfeld** ☐
Nimzo Indian ☐ **Sicilian** ☐
Learn to Play Chess ☐ £5.95
Pirc ☐ **English** ☐ **Italian Game** ☐ **Petroff's** ☐
Ruy Lopez (Open et al) ☐ **Ruy Lopez** (Closed) ☐
} £2.95 each (3 or more £2.50 each)

Supplied on tape but CAS allows disk users to transfer data files easily to disk. For disk users, 3 or more supplied on disk.
Please state whether 40 track ☐ or 80 track ☐ *Price inc. VAT & P&P*

Please state DFS ______________________

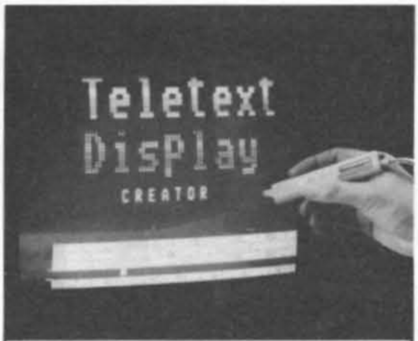
Datapen BBC Lightpen Programs Datapen



BEEBPEN DRAWING PROGRAM

A comprehensive Mode 2 colour drawing program allowing plot commands, painting, circles, text, character defining, saving and loading to tape or disc, all to be selected and used with the lightpen.

PRICE £11.95



TELETEXT DISPLAY CREATOR/EDITOR

Allows the busy programmer to quickly create Mode 7 colour graphics and test screens for combination into his or her own programs. Movable on screen menu allows use of complete screen for graphics. Full instructions and a discussion on teletext features are provided. **PRICE £9.95**

BRITAIN

The first in a series of educational Geography and Geology programs. Britain comes complete with three sets of tests, and these may be very easily changed by adding DATA statements in the Basic program. Full instructions and grid map supplied.

PRICE £6.95

SUPERIOR PERFORMANCE

- Insensitive to ambient lighting
- Responds to different colours
- Program accessible LED lamp readout
- Switch for program control

SUPERIOR PROGRAMS

- Tape storage of your work
- Good documentation
- User routines provided on tape and on printout

Please deduct £1.50 off each program if more than 1 ordered.

The Datapen Lightpen itself comes complete with handbook, software on tape including two drawing programs and a printed listing showing useful routines.

PRICE £25.00

Two drawing programs, SKETCH and SHAPE-CREATE are included with the lightpen and the programs shown above may be ordered additionally, or separately as required.

All prices above include VAT, postage and packing.

Please send your cheque/P.O. to:-

Dept.MU2 Datapen Microtechnology Ltd.,
Kingsclere Road, Overton,
Hants. RG25 3JB (0256 770488)

Astro-Mines listing

From Page 161

```
  340 IFGX>X%THENG1=-1
  350 IFGX=X%THENG1=0
  360 IFGY<Y%THENG2=1
  370 IFGY>Y%THENG2=-1
  380 IFGY=Y%THENG2=0
  390 IFGX=X ANDGY=Y ANDL THEN470
  400 GT=GT+1
  410 IFGT/2=INT(GT/2)GX=GX+G1:GY=GY+
G2
  420 T=T+1:IFT=3THENT=1
  430 PRINTTAB(GX,GY);G$(T)
  440 IFB(GX,GY)=2THENSOUND1,1,0,1:PR
INTTAB(GX,GY);"*":G=0
  450 IFGX=X%ANDGY=Y% THENPROCEND:MOD
E7:VDU23;8202;0;0;0;:PROCINTRO:GOTO80
  460 IFL=0THEN500
  470 IFINT(GX)=X ANDINT(GY)=Y ANDL=1
 THENSC=SC+20:PROCSC:SOUND1,1,0,1:PRI
NTTAB(GX,GY);" ":G=0:L=0:N=1000:NEXT

  500 IFA$=" "THENPRINTTAB(X%,Y%);" "
:X%=X%+Q%:Y%=Y%+W%:PRINTTAB(X%,Y%);A$
(R%):SOUND0,4,10,1
  510 IFL=0THEN560
  520 IFX=38ORX=1ORY=1ORY=20THENN=100
0:PRINTTAB(X,Y);" ":NEXTN:L=0
  530 IFB(X+Q,Y+W)=2THENN=1000:PRINTT
AB(X,Y);" ":NEXTN:L=0
  540 IFL=0THEN560
  550 PRINTTAB(X,Y);" ":X=X+Q:Y=Y+W:N
EXT:L=0
  560 GOTO130
  570 DEFPROCUSR
  580 IFSTA=1THENENDPROC
  590 VDU23,224,16,56,124,254,254,238
,198,130
  600 VDU23,225,31,63,127,255,15,14,1
2,8
  610 VDU23,226,248,124,62,31,62,124,
248,0
  620 VDU23,227,8,12,14,15,255,127,63
,31
  630 VDU23,228,65,99,119,127,127,62,
28,8
  640 VDU23,229,16,48,112,240,255,254
,252,248
  650 VDU23,230,0,31,62,124,248,124,6
2,31
  660 VDU23,231,248,252,254,255,240,1
12,48,16
  670 VDU23,232,255,137,72,63,31,1,59
,31
  680 VDU23,233,248,6,129,200,228,55,
152,255
  690 VDU23,234,0,0,128,96,24,134,1,2
55
  700 VDU23,235,59,1,31,63,72,137,255
,0
  710 VDU23,236,152,55,228,200,129,6,
248,0
  720 VDU23,237,1,134,24,96,128,0,0,0
  730 VDU23,238,0,60,126,126,126,126,
60,0
  740 VDU23,239,130,68,56,40,56,68,13
0,0
  750 VDU23,240,16,16,56,238,56,16,16
,0
  760 VDU23,241,0,0,0,24,24,0,0,0
  770 VDU23,255,255,255,255,255,255,2
55,255,255
  780 DIMA$(8):FORI=1TO8:A$(I)=CHR$(I
+223):NEXT
  790 S$=CHR$(232)+CHR$(233)+CHR$(234
):S1$=CHR$(235)+CHR$(236)+CHR$(237)
  800 ENDPROC
  810 DEFPROCINIT
  820 ENVELOPE2,5,1,1,-2,1,1,1,0,0,0,
0,126,126
  830 ENVELOPE3,1,3,4,5,5,5,5,0,0,0,-
2,126,120
  840 ENVELOPE1,1,-5,-5,-5,3,3,3,-1,-
1,-1,-1,126,126
  850 ENVELOPE4,1,0,0,0,1,1,1,-2,-2,-
2,-2,126,0
  860 G1=0:G2=0:GX=0:GY=0:Q=0:W=0:X=0
:Y=0:G=0:A=5:A1=0:A$="":L=0:R%=1:X%=1
0:Y%=10:Q%=0:W%=-1
  870 DATA0,-1,1,-1,1,0,1,1,0,1,-1,1,
-1,0,-1,-1
  880 IFSTA=0THENRESTORE870:DIMQ%(8),
W%(8),B(39,29),G$(2):FORI=1TO8:READQ%
(I),W%(I):NEXT
  890 T=1:GAL=1:G$(1)=CHR$(239):G$(2)
=CHR$(240)
  900 FUEL=7.9:JK=1:SF=SINFUEL:CF=COS
FUEL:SC=0
  910 ENDPROC
  920 DEFPROCSCRN
  930 VDU23;8202;0;0;0;:PRINTTAB(15,1
4);"PLEASE WAIT"
  940 FORI%=1TO39:FORJ%=1TO29:B(I%,J%
)=0:NEXT:NEXT
  950 FORI%=1TORND(50)+100
  960 B(RND(39),RND(20))=1
  970 NEXT
  980 CLS
  990 FORI=1TOA:M=INT(RND(38)+1):L=IN
T(RND(18)+1):PRINTTAB(M,L);"*":B(M,L)
=2:NEXT:L=0
 1000 X%=19:Y%=10:IFB(X%,Y%)=1THENB(X
%,Y%)=0
 1010 MOVE0,310:PLOT1,1279,0:PLOT1,0,
-300:PLOT1,-1279,0:PLOT1,0,300
 1020 MOVE0,310:PLOT1,25,25:PLOT1,122
9,0:PLOT1,25,-25:FORI=20TO1259STEP20:
MOVEI,310:PLOT1,0,20:NEXT
 1030 PRINTTAB(17,26);S$;TAB(17,27);S
1$
 1040 MOVE520,200:PLOT1,200,0:PLOT1,0
,-80:PLOT1,-200,0:PLOT1,0,80
 1050 MOVE511,209:PLOT1,221,0:PLOT1,0
,-101:PLOT1,-221,0:PLOT1,0,101
 1060 PRINTTAB(2,24);"CARGO ";A1:MOVE
45,220:PLOT1,320,0:PLOT1,0,40:PLOT1,-
320,0:PLOT1,0,-40:MOVE35,210:PLOT1,34
0,0:PLOT1,0,60:PLOT1,-340,0:PLOT1,0,-
60
 1070 MOVE511,209:PLOT1,221,0:PLOT1,0
,-101:PLOT1,-221,0:PLOT1,0,101
 1080 PRINTTAB(2,24);"CARGO ";A1:MOVE
45,220:PLOT1,320,0:PLOT1,0,40:PLOT1,-
320,0:PLOT1,0,-40:MOVE35,210:PLOT1,34
0,0:PLOT1,0,60:PLOT1,-340,0:PLOT1,0,-
60
 1090 PRINTTAB(2,27);"GALAXY ";GAL:MO
VE45,126:PLOT1,350,0:PLOT1,0,40:PLOT1
```

→

40/80 TRACK SWITCHABLE 400K

(genuine half height)

£156 inc. VAT and carriage.

- ★ Other drives available – call for details.
- ★ Integral power supply for dual unit is £35.00 inc VAT.
- ★ Full 12 months guarantee.
- ★ One of the quietest drives in operation.
- ★ Very low power consumption (BBC runs two drives).

SINGLE/DOUBLE DENSITY FILING SYSTEM BY UDM

- *Runs Elite, Mini-Office, Scribe, Starbase*
- *Acorn compatible – runs BASIC, VIEW, WORDWISE, BCPL*
- *Compatible with 2nd Processors, Teletext, Osword 7F*
- *Automatic switching between 40 and 80 track mode*
- *Automatic switching between single and double density*
- *Disc formatter in ROM*
- *Complete with manual*

£91 inc VAT and p&p for D.F.S.

2.0 version now available

2.0 upgrade £5.75 inc

NEW REPLICA II

Tape to disc utility for UDM DFS – **£13.00 inc VAT and p&p**

DRIVE CASES

	Ex VAT	*inc VAT*
Slimline	**£12.00**	**£13.80**
Full height	**£16.50**	**£18.98**

Please add £2.00 p&p

EPROMS	*ex VAT*	*inc VAT*
2764	**£5.50**	**£6.33**
27128	**£12.50**	**£14.38**
8271	**£70.00**	**£80.50**

Please add £1.00 p&p
Discount available on quantity

Add £6.00 p&p

400K DRIVES £125 inc VAT

80 tk double sided, full height

200K DRIVES £90 inc VAT

80t single sided, full height

Single drive Data cable £9.77 inc VAT
Single drive Power cable £5.17 inc VAT
Add £1.00 p&p

DISKETTES

(per box of ten) inc VAT + p&p

	Wabash	Datalife
40 tk ss sd	**£14.50**	–
40 tk ss dd	–	**£18.00**
40 tk ds dd	**£19.00**	**£24.00**
80 tk ds dd	**£24.25**	**£29.35**

40 tk ss dd (10 of) **£14.00** inc VAT and p&p
40tk ds dd (10 of) **£19.00** inc VAT and p&p
includes free library case

25 single sided double density diskettes in a 50 capacity storage box £36.50 inc VAT p&p.

25 double sided double density diskettes in a 50 capacity storage box £50.00 inc VAT p&p.

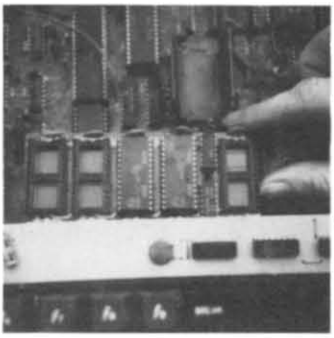
Empty 40-50 capacity storage box at £10.00 inc. VAT p&p

CD CARSON DEVELOPMENTS (MU)
84 Highfield Road, Romford, Essex, RM5 3RU
Telephone: 0708 27043

BBC Model B
£360 Inc. VAT

Monitors and Printers also in stock.

UP TO 32k SIDEWAYS RAM BD FOR THE BBC PLUS CAPABILITY OF WRITE PROTECTION INCLUDED



This RAM board comes complete with 16k of RAM fitted and sockets available for an additional 16k RAM which can be fitted later by plugging in, this will give a total capability of 32k.

Plugs directly into socket 12 or 15 in BBC or onto one of the H.C.R. ROM boards. No soldering will be required and it has the extra bonus of a write protect switch to be mounted either in the reset space, rear of case or in spare LED position on right hand front of keyboard. A right protect switch is fitted to prevent corruption of data loaded into RAM.

HCR ELECTRONIC SERVICES
THE INDUSTRIAL UNIT, PARKER ROAD
CHELMSFORD, ESSEX CM2 6ES
Tel: Chelmsford (0245) 350188

Sideways RAM is intended to run sideways ROM type software of your own either under development or as an alternative to actually committing to expensive eproms.

Sideways software may be kept on disc and loaded into sideways RAM simply by typing *Load<NAME>8000. The RAM can be loaded 16k at a time or by assembling to Hex 8000. A simple program is provided in the manual to transfer software (in RAM or ROM) into user RAM where it can be modified and written back to RAM or saved on disc. With suitable software RAM can be used as a printer buffer or as a data store, etc.

Supplied complete with 16k of RAM and easy fitting instructions
£31.50 (£36.22 inc VAT)
Further 16k RAM
£20.00 (£23.00 inc VAT)
Please allow £2.00 P&P

Also available: Internal 16 socket ROM/RAM card, External 28 socket ROM/RAM card, Eprom Programmer & eproms

HCR ELECTRONIC SERVICES

Astro-Mines listing

From Page 163

```
,-350,0:PLOT1,0,-40:MOVE36,114:PLOT1,
370,0:PLOT1,0,60:PLOT1,-370,0:PLOT1,0
,-60
 1100 MOVE1000,70:PLOT69,1000,70:PLOT
85,1000,270:PLOT85,1200,70:PLOT85,120
0,270
 1110 GCOL0,0:PLOT69,1100,170:FORU=1T
07.4STEP.1:PLOT69,1100,170:PLOT85,110
0+(COSU*90),170+(SINU*90):NEXT
 1120 GCOL0,1
 1130 VDU5:MOVE1010,50:PRINT"ENERGY":
MOVE1000,20:PLOT1,0,37:PLOT1,200,0:PL
OT1,0,-40:PLOT1,-200,0
 1140 VDU5:MOVE55,65:PRINT"SCORE"
 1150 MOVE45,35:PLOT1,350,0:PLOT1,0,4
0:PLOT1,-350,0:PLOT1,0,-40:MOVE36,25:
PLOT1,370,0:PLOT1,0,60:PLOT1,-370,0:P
LOT1,0,-60
 1160 MOVE845,90:PLOT1,-80,80:PLOT1,8
0,80:PLOT1,80,-80:PLOT1,-80,-80:PLOT1
,0,155:MOVE765,170:PLOT1,155,0
 1170 MOVE845,110:PLOT1,-60,60:PLOT1,
60,60:PLOT1,60,-60:PLOT1,-60,-60
 1180 VDU4:PRINTTAB(26,26);""
 1190 VDU5:MOVE715,290:PRINT"POSITION
"

 1200 MOVE705,253:PLOT1,270,0:PLOT1,0
,50:PLOT1,-270,0:PLOT1,0,-50
 1210 MOVE420,65:PRINT"MINE DETECTOR"
:MOVE423,65:PRINT"MINE DETECTOR"
 1220 MOVE417,35:PLOT1,420,0:PLOT1,0,
40:PLOT1,-420,0:PLOT1,0,-40
 1230 VDU4:ENDPROC
 1240 DEFPROCGUAGE:VDU4:GCOL0,0:MOVE1
100,170:PLOT1,70*CF,70*SF:GCOL0,1:FUE
L=FUEL-(7.3/50):SF=SINFUEL:CF=COSFUEL
:MOVE1100,170:PLOT1,70*CF,70*SF:ENDPR
OC
 1250 DEFPROCEND
 1260 STA=1
 1270 SOUND1,0,0,0:SOUND2,0,0,0:SOUND
3,0,0,1
 1280 *FX10,3
 1290 *FX9,2
 1300 FORJ=1TO3
 1310 X1=X%:X2=X%:X3=X%:X4=X%:Y1=Y%:Y
2=Y%:Y3=Y%:Y4=Y%
 1320 Z=-15
 1330 REPEAT
 1340 A=INT(RND(4)):IFA=2THENVDU19,0,
RND(7)+7,0,0,0
 1350 PRINTTAB(X1,Y1);".";TAB(X2,Y2);
".";TAB(X3,Y3);".";TAB(X4,Y4);"."
 1360 SOUND0,Z,-2,4:Z=Z+1
 1370 FORG=1TO100:NEXTG
 1380 PRINTTAB(X1,Y1);" ";TAB(X2,Y2);
" ";TAB(X3,Y3);" ";TAB(X4,Y4);" "
 1390 X1=X1-1:X2=X2-1:X3=X3+1:X4=X4+1
:Y1=Y1-1:Y2=Y2+1:Y3=Y3-1:Y4=Y4+1
 1400 UNTILX1=1 ORX3=1 ORX2=38 ORX4=3
8 ORY1=1 ORY2=21 ORY3=1 ORY4=21
 1410 FORU=1TO500:NEXT:NEXT
 1420 VDU19,0,0,0,0,0
 1430 FORG=1TO500:NEXTG:ENDPROC
 1440 DEFPROCGAL:VD=INT(RND(3)-1):IFV
D=2THENVD=4:VDU19,0,VD,0,0,0:ELSEVDU1
9,0,VD,0,0,0
 1450 A1=0:A=A+1:GAL=GAL+1:CLS:FUEL=7
.8:SOUND1,3,52,100:SOUND2,3,50,100:PR
OCSCRN:PROCGUAGE:ENDPROC
 1460 DEFPROCSC:GCOL0,0:VDU5:MOVE250,
65:PRINTCHR$(255);CHR$(255);CHR$(255)
;CHR$(255):GCOL0,1:MOVE0,65:PRINTSC:V
DU4:ENDPROC
 1470 DEFPROCINTRO
 1480 PRINTTAB(0,0)
 1490 R=129:Y=131:FORI=1TO2:PRINTSPC(
7);:VDU141,Y,65,R,83,Y,84,R,82,Y,79,1
35,45,Y,77,R,73,Y,78,R,69,Y,83,135:PR
INT:NEXT
 1500 PRINT:FORI=1TO2:PRINTTAB(8);CHR
$(141);CHR$(136)"BY GRAHAM.D.WALKDEN"
:NEXT
 1520 PRINT':FORI=1TO2:PRINTCHR$(141)
;SPC(7);CHR$(131);"ENGAGE CAPS LOCK";
CHR$(133);CHR$(136);"NOW":NEXT
 1530 IFSC>HS HS=SC
 1540 D$=CHR$(141)+CHR$(134)+"LAST SC
ORE"+CHR$(135)+STR$SC
 1550 PRINT'TAB(11);D$:PRINTTAB(11);D
$
 1560 PRINT:D$=CHR$(141)+"HIGH SCORE"
+CHR$(136)+CHR$(131)+STR$HS
 1570 PRINTTAB(12);D$:PRINTTAB(12);D$
 1580 PRINT'CHR$(R);"PRESS";CHR$(Y);"
P";CHR$(R);"TO PLAY OR";CHR$(Y);"I";C
HR$(R);"FOR INSTRUCTIONS"
 1590 REPEAT:A$=GET$:UNTILA$="P"ORA$=
"I"ORA$="t"
 1600 IFA$="P"THENSTA=1:PROCINIT:A=5:
ENDPROC
 1610 CLS
 1620 D$=CHR$(141)+CHR$(Y)+"INSTRUCTI
ONS":Y=1:FORJ=1TO2:PROCTELETEXT:NEXT

 1630 RESTORE1700:FORJ=1TO15:READD$:A
$=INKEY$(0):PROCTELETEXT:NEXT:Y=Y+1:D
$=CHR$(141)+CHR$(130)+"PRESS ANY KEY"
:FORJ=1TO2:PROCTELETEXT:NEXT
 1640 AB=GET:CLS:Y=1:FORI=1TO7:READD$
:PROCTELETEXT:NEXT:Y=Y+2:D$=CHR$(141)
+CHR$(133)+"PRESS ANY KEY":FORJ=1TO2:
PROCTELETEXT:NEXT
 1650 AB=GET:CLS:D$=CHR$(141)+CHR$(13
1)+"CONTROLS : ":Y=0:FORJ=1TO2:PROCTE
LETEXT:NEXT
 1660 FORJ=1TO7:READD$:PROCTELETEXT:N
EXT
 1670 Y1=131:PRINT':D$=CHR$(R)+"PRESS
"+CHR$(Y1)+"Z"+CHR$(R)+"TO ROTATE LEF
T":PROCTELETEXT:D$=CHR$(R)+"PRESS"+CH
R$(Y1)+"X"+CHR$(R)+"TO ROTATE RIGHT":
PROCTELETEXT:D$=CHR$(R)+"PRESS"+CHR$(
Y1)+"SPACE"+CHR$(R)+"TO MOVE FORWARD"
:PROCTELETEXT
 1680 D$=CHR$(R)+"PRESS"+CHR$(Y1)+"<R
ETURN>"+CHR$(R)+"TO FIRE":PROCTELETEX
T:PRINT''':D$=CHR$(134)+CHR$(136)+CHR
$(141)+"PRESS ANY KEY":Y=Y+2:FORJ=1TO
2:PROCTELETEXT:NEXT
 1690 A$=GET$:CLS:GOTO1480
 1700 DATA"You are the captain of the
 starship","'GALAXY HOPPER' and your
mission is to","search the galaxy for
 planets suitable","for mining. You m
ust clear each galaxy","before you ar
e destroyed by aliens, or","you run o
ut of fuel."," "
 1710 DATA"To make matters worse, the
 star systems","have been mined by th
e aliens, and","the mines are highly
dangerous to your","ship, though your
 photon torpedoes and","alien space-c
raft will pass through","unscathed.",
" "

 1720 DATA"","To play, use the keys m
entioned later","to position your shi
p on top of the","planets ( asterisks
 ). As you clear","each screen, the g
ame will become","increasingly harder
, with more planets."
 1730 DATA"Pay particular attention t
o your fuel."
 1740 DATA""
 1750 DATA"Your space-craft is equipp
ed with a mine","detector situated in
 the centre of the","control panel. W
hen a mine is detected","in front of
you, a white circle will","appear in
front of the imitation space","ship o
n the panel."," "
 1760 END
 1770 DEFPROCTELETEXT:X=(39-LEND$)/2
 1780 PRINTTAB(X,Y);D$:Y=Y+1:ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 189.

MICROMAN Computers

ACORN SPECIALIST COMPUTER CENTRE

BBC COMPUTERS:

BBC Model B	399.00
BBC Model B + DFS	469.00
BBC Model B + Econet	446.00
BBC Model B + DFS + Econet	516.00
BBC Hard Cover	11.95
Acorn Teletext Receiver	225.00
Acorn Prestel Receiver	113.85
Acorn 6502 2nd Processor	199.00
Acorn Z80 2nd Processor	399.00
Acorn IEEE Interface	325.00
Bitstick	375.00
Acorn Music 500	199.00

ELECTRON COMPUTER:

Electron + Free Software	199.00
Electron Me & My Micro Pack	229.00
Plus One Interface (Printer/Joystick)	59.95
Plus Three Interface (DFS/Disc Drive)	229.00

TORCH COMPUTERS:

Z80 Disc Pack	799.00
Z80 2nd Processor Card	339.00
Graduate	P.O.A.

ECONET SYSTEM:

Full Service Available	P.O.A.

BBC FIRMWARE:

View ROM	59.80
Wordwise ROM	44.85
Wordwise Plus ROM	56.35
Viewsheet ROM	59.80
Speech Synthesizer	55.00
Ultraçalc Spreadsheet ROM	74.75
Graphics ROM	33.35
Disc Doctor ROM	33.35
Printmaster ROM	33.35
Communicator ROM	69.00
Termi Emulator ROM	33.35
Gremlin Debug ROM	33.35
Caretaker Basic Utility ROM	33.35
Toolstar ROM	34.00
Commstar EPROM	34.00
BCPL ROM	99.65
System ADE ROM	60.00
System SPY ROM	30.00
Edword User Pack	44.79
Edword Teacher Pack (Disc)	25.24
Merlin Scribe	59.95
Beebug Soft - Full range available	
Gemini Datagem Database ROM	129.00
Acorn ISO Pascal	69.00
Acorn Logo ROM	69.00
Slave ROM	49.95

BBC UPGRADES:

A-B Upgrade (Fitted)	95.00
A-B Upgrade (Excluding Fitting)	80.00
Acorn DFS Interface (Fitted)	109.00
Opus DD/DFS Interface	129.95
Solidisk DD/DFS Interface	39.95

EXPANSION BOARDS:

APTL Sidewise ROM Board	43.70
Aries B20 RAM Expansion Board	79.95
Aries B12 Sideways ROM Board	46.00
Aries B12c Adaptor	5.75

SOLIDISK PRODUCTS:

Solidisk 32K Sideways RAM	57.95
Solidisk 96K Extension	92.00
Solidisk 128K Sideways RAM	149.95
Solidisk 256K Sideways RAM	P.O.A.
Solidisk DD/DFS Interface	39.95
Eprom Programmer	20.95
Eprom Eraser	20.95

PACE 5.25" DISC DRIVES:

PSD1 SS/40T/100K	119.95
PSD3 DS/40T-80T/400K	199.00
PDD3 DS/40-80T/800K	390.00

CUMANA 5.25" DISC DRIVES:

CS100 SS/40T/100K (PSU)	159.95
CS400 DS/40-80T/400K (PSU)	215.95
CD800S DS/40-80T/800K (PSU)	414.95

CUMANA 3.5" DISC DRIVES:

CSX351 100K 40T (No PSU)	139.95
CSX354 400K 40-80T (No PSU)	199.95
CD358 800K 40-80T Dual (With PSU)	429.95

DISC UTILITIES:

View Index	14.95
View Printer Driver Generator (New)	11.50
Hi-View	59.80
Acornsoft Database	15.35
Clares Betabase 40/80T Available	25.00
Clares Graphdisk 40/80T Available	12.95
Clares Replica II Disc Copier 40T	11.95
Clares Replica II Disc Copier 80T	11.95
Clares The Key 40/80T Available	12.95
Beebugsoft Masterfile II	19.00
Acorn Plotter Drivers	P.O.A.

PRINTERS:

Cannon PW-1080A/Kaga	330.00
Cannon PW1156A/Kaga	415.00
Epson RX80FT	275.00
Brother M1009	199.95
Juki 6100 Daisywheel	399.00
Juki 2200 Daisywheel Typewriter	299.00

MONITORS:

Microvitec Cub Standard	210.00
Microvitec Cub Medium	299.00
Micxrovitec Sinclair QL Monitor	275.00
Zenith Amber	104.00
Zenith Green	99.00
Philips Green	89.00
Philips TV/Monitor	229.00

MODEMS:

Pace Nightingale inc Commstar ROM	159.85
Pace Nightingale	136.85
Telemod 2	84.95
Telemode 3 special price	159.00
Telemod Software BBC User/User	19.95

JOYSTICKS:

Sure Shot Joystick	18.95
Voltmace Delta 14b Handset	14.95
Voltmace Delta 3b Dual	19.95

BBC BUSINESS SOFTWARE

Microsimplex	287.50
Gemini Integrated Accounts	99.95
Sage Accounts	431.25

CONTROL/ROBOTICS

AMX Mouse	79.95
Penman Plotter	274.85
Commotion EVI/SS Camera	P.O.A.

SHINWA CP80A
100 CPS, proportional spacing,
tractor and friction feed.

199.00
inc. VAT

ACORN APPROVED SERVICE CENTRE

Our workshops offer a full repair and upgrade service
SHOP OPEN 9-6 Mon-Sat.

EDUCATIONAL & INDUSTRIAL ENQUIRIES WELCOME

Please phone for our price list
All prices include VAT, Post & Packing
£10 (Large items) £1 (Small items ROM's etc)

VISA

**RAINFORD INDUSTRIAL ESTATE, MILL LANE,
RAINFORD, ST. HELENS, MERSEYSIDE
PHONE 074488 5242**

IN BROMLEY

**BROMLEYS FIRST
SPECIALIST COMPUTER STORE**

We are official Acorn Dealers with high standards to maintain and take pride in friendly and efficient advice and service.

See our extensive range of printers, monitors, disc drives, software and books.

Data Store

6 Chatterton Road, Bromley, Kent. 460 8991

---

an INTRODUCTION to RANDOM ACCESS FILING on the BBC MICRO

This 120 page book is supplied with a FREE **floppy disc containing** TWO **demonstration systems - a** STOCKFILE SYSTEM **and a** PERSONNEL SYSTEM

IF YOU WANT

- to use your disc drives as something more than just fast cassettes.
- to be able to store and retrieve data instantly.
- to learn how to create your own systems.
- to understand how Filing Systems can work.
- to join the vast numbers of people worldwide who have benefited from this package.

**THEN YOU CAN BUY THE BOOK FOR
£12.50 COMPLETE FROM:
The Computer Room 206 Main Street
Newthorpe Nottingham 0773 718578**

MICROMAIL

Stop those DZAP pirates from DZAPping

MAKING Basic programs unlistable is easy. But if a pirate wants to see your program then he could use Disc Doctor's DZAP command and the contents of your disc will be displayed.

*Here is a routine that will allow you to stop people from using *DZAP. It will also stop pirates from looking at the contents of your disc.*

*First take a blank disc. Then type in SAVE"AA" <CR>. When you have done this type *DZAP – you will need Disc Doctor yourself.*

Then move to edit the "A" and press TAB. Then type in OC and the first "A" will disappear.

Next move the cursor to the next "A" and type 15. This will insert a clear screen and VDU disable characters at the start of the disc. Press Esc and enter "Y".

*Now type *TITLE "AA" and *DZAP and repeat the above for those two A's. This will clear the screen and stop the Beeb when you catalogue the disc.*

*Now to stop *DZAP. Type *DZAP and press Ctrl/cursor right ONCE. You will see at the right of the top line 01 90 (40 tracks) or 03 20 (80 tracks). Move along to these numbers and press TAB.*

*Type 00 and move the cursor along to the next character and type 00 then press Esc and Y. Then try *DZAP and you will get bad disc size.*

*This stops pirates from using *DZAP and also *CAT. Some pirates with brains will think ah ha, type in *TITLE "" will let me catalogue the disc. This will not work because you have already inserted another VDU &0C AND VDU &15.* – **D. MacDermott, Wythenshawe, Manchester.**

● A very interesting and useful method of protection. However, once a disc has been 'protected' in this way, it cannot be SAVE'd to. You have been warned.

Shinwa £ patch

HAVING read Mike Cook's Problem Page in the December 1984 issue of The Micro User regarding printing a '£' sign using a Shinwa CP80, I can sympathise with G.I. de Glanville as I once had this problem myself.

Thanks to V. Haworth, a fellow member of the Beebug User Group, I was able to adapt his Seikosha pound patch program to be compatible with the Shinwa CP80.

This program changes the contents of the buffer insert vector which is located at &22A and &22B to 'point itself'. The character &60 (BBC pound) is searched for and changed to &81 (Shinwa pound) providing the printer is on line.

Once it has been run all occurrences of '£' will be printed correctly. You may load other programs without affecting its operation, also pressing 'Break' does not affect it.

It works with the View word processor and should work with others. – **D.A. Clover, Marham, Norfolk.**

```
   10 FOR I%=0 TO 2 STEP 2:
P%=&90
   20 [OPT I%
   30 CMP#&60:\ BBC pound
   40 BNEexit
   50 CPX#3
   60 BNE exit
   70 LDA#&81:\ Shinwa poun
d
   80 .exit
   90 JMP &E4B3:]
  100 NEXT
  110 ?&22A=&90:?&22B=0
  120 *KEY10 ?&22A=&90:?&22
B=0:VDU12|M
```

Recorder fault

I HAVE recently come across a rather bizarre fault on a Sanyo DR 101 and I wonder if any other users have had a similar problem – two friends of mine certainly have.

In my case the problem occurred when I was reviewing a C45 that I use as one of my 'master tapes'. Fortunately I took the advice given in one of your earlier issues and make two masters and one everyday copy of all tapes.

Even so, if I had not been fortunate enough to quickly spot the problem I could have easily wrecked all three!

On the DR 101 the erase head seems to be a small permanent magnet which moves forward with the tape guide at the left of the tape path only when the Record/Save key is pressed – or so the theory goes.

The guide/head assembly is held in place by a single screw which is locked in place by the application of a blob of paint during manufacture.

On my machine, however, the paint had either not been applied or had failed to take, thus leaving the screw able to work loose.

This was also the case with the recorders of my friends although I have since opened up about six more and all was well with these.

If the screw works loose then the whole guide/erase assembly will move slightly out of position and the linkage which causes the erase head to swing back out of the way in Play/Load fails to engage, leaving the erase head free to move in on the tape and cause havoc.

The fact that the anti-record tabs may be broken out of the cassette will give no protection in this case.

If any readers find that portions of a tape suddenly go blank for no obvious reason I would advise that they do not reach for their back-up copy before checking their data

→

Cure for hyper crashes

HAVING overcome a slight problem I had with my disc – original – copy of Elite which crashed fairly frequently on docking or hyperspace, I thought you might like to let your readers know of a fool-proof solution.

The problem seemed to be caused by reading data off the protected program disc. This can easily be remedied by copying the data files onto a normally formatted disc.

*Simply type "*COPY 0 0 D.*" and "*COPY 0 0 T.*" You will not be able to *BACKUP the original due to its protection.*

If using dual drives your task will be a lot less laborious as there are 18 files to copy. Once completed however the main program can be loaded as normal off the original disc, and the one with the copied data files used in its place from then on.

One word of warning. The original problem – the screen filling up with a load of rubbish on docking – seems to reoccur if you save another file, even a commander, to this disc.

I hope this relieves considerable frustration previously experienced by myself and several others on what is otherwise a truly excellent game. – **Commander Wycliffe (Deadly) Slingsby.**

MICROMAIL

From Page 167

recorder or they could loose everything.

A fairly straight-forward exploratory operation, a deft twist of a sterile screwdriver followed by the delicate appication of an antiseptic dab of paint will soon have the patient reproducing faithfully again.

If may be that this ailment will not strike any other readers – perhaps this is a localised complaint. Despite this problem the DR 101 is a very good data recorder and is very reasonably priced.

Keep up the good work and let's see Bob scoring over Andrea more often – all done in the best possible taste, of course. In all fairness I can imagine how a micro-widow feels – I've got one of my own downstairs. – **A.P. Lee, Worthing, West Sussex.**

P.S. How about a photo of Alice in a future issue? Some of my friends say she doesn't exist and the articles are written by Mike Cook after a body building course. It's up to you to disprove it!

● Thank you for bringing this to the attention of our readers. It may offer a solution to anyone who has found that they have lost a program for no apparent reason.

We're afraid the only photograph we have of our dear Alice is still covered by the Official Secrets Act and stamped "dangerous, only to be viewed after a pinch of ground bats-wing". We wouldn't recommend it to anyone.

Defined keys

DO you know about the ability of the BBC Micro to type in Basic words using combinations of the function and shift or control keys? We found the Basic words shown in Figure I while experimenting.

However, you cannot use this facility to put keywords within the inverted commas of a PRINT statement.

As an example of how this can be used, try typing in the program below. While typing, the underlined words may be entered using the function and control or shift keys.

You will see that the words do not appear as you type but the cursor moves one space. Also, in some cases, graphics characters appear. Ignore these and continue to type as normal.

When you list the program though the words are there, the graphics characters are gone and the program appears as below.

What's more, when you run the program, it will work!

Note that you must type words such as PAGE and so on in full when within inverted commas.

It also appears that no extra memory space is used with this method and it helps in typing listings.

```
10 CLS
20 FOR C=0 TO 7
30 MODE C
40 PRINT TAB(10,2);"MODE ";C
50 TIME=0
60 FOR X=0 TO 20 STEP 10
70 PRINT PAGE;"=PAGE"
80 PRINT LOMEM;"=LOMEM"
90 PRINT HIMEM;"=HIMEM"
100 PRINT HIMEM DIV LOMEM;"
HIMEM/LOMEM"
110 PRINT TIME;"=TIME"
120 PRINT " "
130 NEXT X
140 IF C=7 GOTO 170
150 INPUT"PRESS <RETURN> TO
CONTINUE",A$
160 NEXT C
170 END
```

— **D. Fawcett, G. Clayton, V. Clayton, Batley, W. Yorks.**

● Thanks for the interesting information. This method was creating problems for A.S. Dawson in the October issue of *The Micro User*.

	f0	f1	f2	f3	f4	f5	f6	f7	f8	f9
Shift	AND	DIV	EOR	MOD	OR	ERROR	LINE	OFF	STEP	SPC
Control	PAGE	TIME	LOMEN	HIMEM	ABS	ACS	ADVAL	ASC	ASN	ATN

Figure I

Going round and round in circles

*ONE of the most serious omissions in BBC Basic is the lack of a CIRCLE command. Hence to draw a circle one has to resort to either the equation for a circle or to plot R*SIN(X) against R*COS(Y) – both of which are very slow.*

This being the case I set forth to develop the procedure shown in the program below. It will draw circles, elipses at any angle and any arcs of the afore mentioned.

The operation of the procedure is fast because at no time within the drawing loop does the procedure have to do any lengthy mathematical operations other than addition, subtraction, multiplication and division.

Information about the curve to be drawn is passed to the procedure via the seven parameters detailed below.

CX	*Centre X. The horizontal displacement of the centre of the curve from the origin.*
CY	*Centre Y. The vertical displacement of the centre of the curve from the origin.*
A	*Radius on the X axis. The semimajor or the semiminor axis of the curve on the X axis.*
B	*Radius on the Y axis. The semiminor or the semimajor axis of the curve on the X axis.*

NOTE: If A and B are equal then either an arc of a circle or a complete circle is drawn.

R%	*Shape rotation angle. In order to draw an elipse with the semimajor and the semiminor axes not co-incident with the X and Y axes a rotational angle must be specified between 0 degrees and 360 degrees.*
S%	*Arc start number.*
F%	*Arc finish number.*

A complete circle or ellipse is divided into 36 by 10 degree arcs with the 0 arc starting at the top of the curve before shape rotation. Arcs 1 to 35 follow in a

```
   10 MODE 4
   20 PROCcurve(640,512,100
,400,0,0,0)
   30 PROCcurve(640,512,100
,400,60,0,0)
   40 PROCcurve(640,512,100
,400,120,0,0)
   50 PROCcurve(640,512,450
,450,0,0,0)
   60 PROCcurve(640,512,500
,500,0,5,13)
   70 PROCcurve(640,512,500
,500,0,23,31)
   80 PROCcurve(640,512,550
,550,0,5,13)
   90 PROCcurve(640,512,550
,550,0,23,31)
  100 PROCcurve(640,512,600
,600,0,5,13)
  110 PROCcurve(640,512,600
,600,0,23,31)
  120 END
  130 :
  140 DEF PROCcurve(CX,CY,A
,B,R%,S%,F%)
  150 S=0.173648178: C=0.98
4807753: SR=SIN(RAD(R%)): C
R=COS(RAD(R%)): X=A*SIN(RAD
(S%*10)): Y=B*COS(RAD(S%*10
)): RX=Y*SR+X*CR: RY=Y*CR-X
*SR: MOVE CX+RX,CY+RY: REPE
AT: S%=S%+1: IF S%=36 S%=0
  160 NX=X*C+A/B*Y*S: NY=Y*
C-B/A*X*S: X=NX: Y=NY: RX=N
Y*SR+NX*CR: RY=NY*CR-NX*SR:
 DRAW CX+RX,CY+RY: UNTIL S%
=F%
  170 ENDPROC
```

● *Want to write to Micromail? The address is: Micromail, The Micro User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.*

clockwise direction.

I hope that this procedure will be of use to your readers. – **W.R. Ord, Whickham, Tyne and Wear.**

Look, no sines

AFTER reading your letter on circle drawing in the December issue of The Micro User I was inspired to write.

While trying to write a machine code circle routine I stumbled on an algorithm which does not use sine/cosines.

No doubt it's old hat to the advanced types but it may be of interest.

If (X,Y) is a point on the circle (origin = centre) and the next point has $Y' = Y+\Delta Y$*, then* $X' = X + \Delta X$ *where* $\Delta X \div -(Y/X)*\Delta Y$.

More reliably: $\Delta X = -((Y+\Delta Y/2/X)*\Delta Y$.

This works over a quarter arc which can then be "mirrored" to make a complete circle.

Any student of calculus and coordinate geometry will recognise the source of the maths.

Incidentally, my machine code routine works and draws a 200 graph-unit radius circle in 10 centiseconds – well I was impressed anyway!

I have an Amcom (Pace) DFS and have written some naughty machine code utilities which access the Basic ROM directly using JSR's and so on.

*These cannot be *RUN giving disc error messages. Why does this happen?*

Finally, thanks for all your articles. You make it all fun and are micro user's best asset. – **M.J. Carter, South Brent, South Devon.**

● *RUN leaves the DFS ROM 'paged-in'. This means that any calls to locations &8000 – &BFFF call the DFS ROM and not the Basic ROM.

This could be the possible cause of your disc fault error message.

If you *LOAD the file and then CALL the execution address your problem should disappear. The obvious solution is to avoid using naughty CALLs.

Sound and STR$ solutions

I AM writing to propose solutions to two problems raised in recent issues.

In the September issue a letter to Mike Cook asked how to turn off the sound during games and a switch in the speaker circuit was suggested.

The sound can be switched off on some operating systems by using the unsupported operating system command:

```
*FX 210,1
```

before the game is loaded. The sound can be restored by typing:

```
*FX 210,0
```

or pressing Break.

Unfortunately the sound cannot be turned back on during a game but this is probably acceptable to avoid having to modify the hardware.

The second problem concerning an apparent fault in the STR$ function was raised in the November issue and is rather more subtle.

The problem arises because BBC Basic represents numbers in three different forms, the binary value in store, the decimal value displayed by a PRINT statement, and the decimal value returned by function STR$.

When a number with a fractional part is stored it is not normally possible to convert the decimal value to an exact binary equivalent, and therefore when Basic tries to print the number the value cannot be converted back to the exact decimal number it was originally.

For example, when 522.44 is converted to binary using the storage method of BBC Basic and is then converted back to decimal it gives a value of 522.4400001 to 10 significant figures.

When Basic tries to print this it rounds the value to the number of significant figures allowed by the current setting of the resident integer variable @% which controls the width of the print column.

Since this is normally set to 10, including the decimal point, the rounded value shown on the screen becomes 522.44.

The User Guide implies that when the STR$ function is called Basic follows the same procedure as PRINT and should therefore arrive at the same answer.

In fact STR$ will normally ignore the setting of @% and always calculate to 10 significant figures. Hence the statement:

```
PRINT STR$(522.44) <CR>
```

will give an answer of 522.4400001.

The solution therefore is to force the STR$ calculation to use the same value of @% as PRINT and this is simply done by making the first byte of @% = 1. The required result can therefore be achieved by:

```
A  = 522.44 <CR>
@% = @% + &1000000 <CR>
PRINT STR$(A), LEN(STR$(A))
<CR>
```

– **G.S. Thorpe, Earley, Reading.**

Keep it secret

AS a reader of your brilliant magazine I thought I would let other readers into a little secret I've got. It is for protecting your software from nasty little people copying it.

```
10 *FX200,2
20 CALL !-4
```

But I do warn you it's impossible to get your program back. – **Ian Berry, Portsmouth, Hants.**

Missing modem

I'M sure you and your readers were very impressed with the autumn announcement of a multi baud modem for £49.95 by Unicom.

The product looked extremely attractive and Unicom were making all the right sort of promises.

They said that the modem would be in production soon. That all potential purchasers could place orders, safe with Unicom's word of honour not to debit credit cards until the modem was ready for despatch.

At the December 1984 Micro User Show Unicom were happily disclosing expected sales of 1,500 units by January 1985, worth approximately £125,000.

However they still didn't have the product in production, but were busily debiting customers credit cards.

I had my credit card debited on November 27, 1984, which was the day I ordered, although at the time of ordering I was told that there was no chance of me receiving a modem until January 1985 because of the vast number of people who had ordered ahead of me.

Furthermore, the amount charged to my account was substantially higher than the amount quoted for the package ordered at the time of ordering by telephone.

The first I knew of the debit was when I received my Visa statement. I immediately called Unicom and asked for a refund.

Just before Christmas I received a letter from another company, who I assume are in some way associated with Unicom. This company, Rushworth Dales, offered me a refund.

I wrote by return of post and accepted, giving them until early January to effect the credit to my Visa account. This never occurred and I therefore asked Visa to help to obtain a refund

In my own case I responded to the advertisement in the December 1984 issue of Micro User and I therefore ask that you bring some pressure to bear to help me recover my £84.

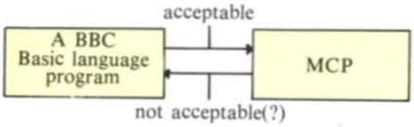
I do however have some considerable reservations, as Acorn User's own advertising people operate from the same address as Unicom and use the same telephone number as Rushworth Dale. – **D.M. Scholes, York.**

MICROMAIL

No way back

I WOULD appreciate your help with the following problem.

My equipment is the BBC Model B and a Z80 Torch Disc pack. My problem is running or writing a BBC Basic language program – how can I go to and/or come back from the Basic language to the MCP field CP/N operating system? Graphically my problem is described as follows:



or else:

10 REM PROGRAM BBC.
20 }
200 }Program lines.
210 *MCP. This command sends control to CPN operating system and it is acceptable. When running the program, the Torch CPN cursor 0A appears on the screen after the output of the program.
220 Basic. This command is not acceptable.

How can I have access to Torch CPN operating system from within a BBC Basic language program? – **John Costis, Athens, Greece.**

● When you are running a program in BBC Basic the Z80 board is in effect disconnected from the system. When you switch to it the BBC Micro becomes an input/output terminal only.

Any program running in is lost and control is passed over to the Z80's operating system CPN.

Therefore while it is possible to issue a BBC Basic command to activate CPN, that command effectively terminates the program so that any later lines are not/cannot be executed.

So unfortunately what you are trying to do is not possible.

To get back into BBC Basic you will have to issue a command from CPN. We know of no way that you can achieve what you want. Sorry.

Key code

COULD you tell me how to make the control key produce an Ascii code? I am trying to make it so that Ctrl and Break doesn't work so you would have to switch the micro off to stop a program.

I already know how to stop Break on its own and how to stop the Esc from working.

Could you also tell me how to make the shift keys produce Ascii codes? – **Reuben Hope (age 11), Doncaster, S. Yorks.**

● An article on disabling the Break key will soon be appearing in *The Micro User*. Unlike the function keys, the shift keys cannot be programmed to produce Ascii characters.

Abort feature

USING the following commands it is possible to create an abort game feature.

I have been able to do this on two games, Vortex and Moonraider.

Just load the game as normal, then type

For Vortex:

```
*KEY10 PAGE=&2700 ¦MOLD
¦MRUN ¦M
```

For Moonraider:

```
*KEY10  ¦M ¦MCALL &1900 ¦M
```

In Vortex this will abort the high score.

On a different topic I think that praise should go to First Byte Computers. Having bought a joystick interface I found I could not run Guardian by Alligata.

I wrote and asked for information.

The following alterations to the Setup program should be made. First load the program as nomal. List it, and then enter:

```
23 .ye: LDY #&FF: LDX #&FF:
LDA #&81: SEC: RTS
24 .no: LDY #&00: LDX #&00:
LDA #&81: CLC: RTS
```

Now enter the key as required. – **James Staniland, Sheffield.**

P.S. This only works on tape systems.

Random answer

I HAVE written a program similar to the cricket game played with six-sided pencils (or dice).

What I cannot understand is why some of the games are exactly the same.

In it there are five RND statements. Is it breaking the law of probability, or is there a simple solution? Could you tell me what's going on? – **D. Corston, Exmouth, Devon.**

● Your problem lies in the fact that the random number generator gets its seed from ROM and this is the same number every time. The way to alter it is to insert the line dummy = RND (–TIME). This seeds the generator with a new number each time.

Very INTeresting!

CAN you help us regarding an interesting bug we have found on the BBC? It was found completely by accident by one of our employees and the fault occurs when asking it to calculate the following:

INT(260.3*100)

*The answer it returns with is 26029 which is obviously incorrect. After trying several other values it also gives 26079 when asked INT(260.8*100). for all other values in the range 260.1 – 260.9 it gives the correct answer.*

I telephoned Acorn with these facts and the lady I spoke to gave me the following reasons after talking to one of the programmers.

"The fault occurs on all micros because any number entered in a decimal format is read by the micro as a recurring number and is then converted into binary.

"In the calculation this binary number then loses several bits so the resultant error occurs".

I then asked why it only occurred with these numbers which she couldn't explain and why not with say 260.33.

I then suggested it might not happen with an IBM PC and she retorted that an IBM costs more than a BBC. This might be true but she did say that it happened on all micros and said that this is why banks don't work in half pences.

I then asked her for a suggested modification to our programs and she said there wasn't one.

I look forward to your reply and hope you can find a suitable solution to our problem. Perhaps you could also tell me what happens to all those millions of half pences that the banks don't use. – **M.B. Smith, Rees Geophysical Limited, Stockport, Cheshire.**

● The answer would seem to be down to the rounding errors introduced by the Basic ROM.

Multiplying these small errors by 100 obviously will make them much larger and the results can sometimes be annoying, if not unacceptable. See also G. Thorpe's letter in this issue.

Dump background

I WAS very impressed by Jim Notman's Teletext Dump.

I find the program very useful because I often want to dump Mode 7 screens as I am a subscriber to Micronet 800 and want real Mode 7 graphics on a hard copy – not just dots as produced by the Micronet ROM.

There was however one thing

missing which can make or break a Mode 7 display. This is the background colour changed by CHR$(157).

I decided to incorporate a routine to print the background. How? Simple, just print the inverse of the character.

There was one snag. Several lines of backgrounded text would be separate on the printout. But all is not lost due to Jim Notman's variable 'close'.

The following changes made to the original program will cause it to print the background:

```
 115  inverse=FALSE
 181  IF R%=157 inverse=TR
UE:close=TRUE
 182  IF R%=156 inverse=FA
LSE
 220  IF (R% AND &7F)<33 A
ND inverse=TRUE THEN FOR L%
=0 TO 7:VDU1,255:NEXT:GOTO2
70:ELSE IF (R% AND &7F)<33
THEN FORL%=0 TO 7:VDU1,0:NE
XT:GOTO270
1025  IF inverse=TRUE PROC
inverse:GOTO 1040
1690  DEFPROCinverse
1700  FOR L%=0 TO 7:VDU1,2
55-(L%?&C00):NEXT
1710  ENDPROC
```

Keep up the great work! – **A.J. Bissex, Radstock, Nr. Bath, Avon.**

Memory mapping

I OWN a BBC B with O.S. 1.2 and Basic II and I am trying to find out how the machine works.

One thing puzzling me is where it stores the name of a program while it searches for it.

For example when I type LOAD "PROGRAM" the Ascii values must be loaded into a series of locations and constantly compared with the filenames it is reading.

It is a cassette system to which I refer, could you enlighten me?

Also on a few of my newer commercial programs I have noticed that the filename of the main parts are called ? As this appears on more than one of my programs I am wondering if there is something special about labelling programs with ? – **R. Lloyd, Worksop, Notts.**

● The Advanced User Guide contains a detailed memory map and will give all the information you require.

A question mark in a filename indicates that the file has been saved with control characters in its name. Colour control characters can be generated by pressing the Shift and any function key.

Spicey echo

HERE'S a little procedure for anybody who wants to play a tune as the intro to a game or for when your character dies during a game.

It uses a pretty standard idea as the basis but it "spices up" the sound by producing a reverb/echo effect.

Unfortunately you can only READ one note at a time.

The variable number *is equal to the number of DATA divided by two. The DATA statements contain the pitch number then the duration of the note.*

Lines 60 to 90 can be altered to produce the amount of echo required. – **Andrew Prince, Stalybridge, Cheshire.**

```
  10 ENVELOPE 1,1,0,0,0,1,
1,1,126,26,0,-100,126,100
  20 RESTORE
  30 FOR N=1 TO number
  40 READ pitch,length
  50 SOUND 1,1,pitch,lengt
h
  60 TIME=0:REPEATUNTILTIM
E=10
  70 SOUND 2,-10,pitch,len
gth
  80 TIME=0:REPEATUNTILTIM
E=6
  90 SOUND 3,-6,pitch,leng
th
 100 NEXT N
 110 DATA pitch,length,...
..etc
```

National
Micro
Centres

have been appointed official educational suppliers to implement the new

Acorn Micros in Schools Scheme

This acclaimed project, which takes over where the DTI's scheme left off, offers exceptional price savings to educational establishments. These include considerably reduced prices on the BBC Micro, Electron, Econet, disc interfaces, file servers, second processors, etc, when purchased by schools, colleges and places of higher education.

For full details contact:

Educational Services Manager, on 061-429 8157.

National Micro Centres,
36 St Petersgate,
Stockport SK1 1HL.

MICROMAIL

Olympic challenger

OVER the last few months I have been eyeing the Micro mail section eagerly, and to my amazement I have found that nobody has got very fast times for Micro Olympics, so I thought I would send in my contribution.

They are as follows:

100m	*7.76*
200m	*15.54*
400m	*38.08*
800m	*1:30.96*
1500m	*3:19.59*
Javelin	*100.41m*
Discus	*71.65m*
Hammer	*84.05m*
Long jump	*8.93m*
High jump	*2.36m*
Pole vault	*5.50m*

– **Ian Goodman, Aberdeen, Scotland.**

Locking up

COULD you tell me how to make my programs totally unlistable?

*I have disabled the Escape key with FX200, 1 and I have used *FX200,3 so that when the Break key is pressed the memory is cleared, so then the program is unlistable.*

You can still list the program by entering LOAD"". Once the program has loaded you can just type in LIST and therefore the program has not RUN and obviously the FX calls have not yet been executed. – **Paul Tanner, aged 15, Gloucester.**

● There is no way of stopping someone LOADing a file unless it has been "locked".

Files which have been locked can only be *RUN and any attempt to LOAD it results in an error message and the load is aborted.

This is only applicable to machine code programs and for the meantime you'll have to leave your Basic ones unprotected.

Gremlins

A GREMLIN seems to have crept into your PROCchange listing in the February issue. Line 30060 should read.

```
30060 IF J%>64 AND J%<91
THEN ?H%= J%+32
```

It looks as though the J%+ was omitted somehow. I hope this helps the readers. – **John Thorpe, Yarmouth.**

● Quite right, well spotted. The mystery however still remains. Looking at our proof copies all is well and the line is complete. Why it did not transfer to the printed page is beyond us.

Opus DFS

I HAVE some information regarding Elite and the Opus DFS.

Acornsoft have now changed their policy and people wishing to change old versions of Elite for ones which will work with the Opus 3.15 DFS should send their old discs to Opus with a cheque for £2.50.

To avoid this problem, those with the Opus system should make sure that, when buying disc based software, they ask for the latest release of the particular program in question.

I hope this will save your readers some of the frustration and waiting which I have had. – **P. Courtnage, Leuchars, Fife.**

Harpsichord

ON reading the November issue of your fabulous magazine I heard the plea of one of your readers for an envelope to sound like a harpsichord.

Well here it is!

```
ENVELOPE 1,1,0,0,0,0,0,0,
120,-6,0,-1,126,80

SOUND 1,1,54,20
```

I hope the reader will be well pleased with my little bit of wisdom. – **Josh!**

Mystery intruder

I HAVE a BBC model B with a 1.2 operating system and have been learning to write assembly language programs. Recently I tested the use of EQUD and EQUB with the short program attached.

The program requires Basic II and simply sets Mode 2, sets the background to red and clears the screen.

These operations are performed correctly, but when the program is subsequently listed a small black rectangle appears near the bottom of the red screen.

I wonder if someone could explain why the screen memory gets corrupted by these operations. – **G.K. Creighton, Loughborough, Leic.**

```
   10 DIM TEST 100
   20 FOR I=0 TO 2 STEP2
   30 P%=TEST
   40 [OPT I
   50 .label EQUD &81110216
: EQUB&0C
   60 .start LDX #5: LDY #0
   70 .repeat LDA label,Y:
JSR &FFEE
   80 INY: DEX: BNE repeat
   90 RTS
  100 ]
  105 NEXT
  110 CALL start
  120 END
```

● Using VDU22 to change mode leaves the value of HIMEM unchanged.

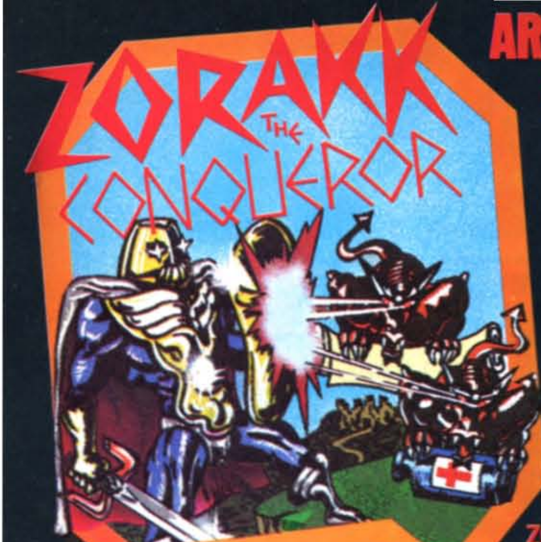
The Basic ROM uses memory just below HIMEM as a stack. This means that any further processing that uses the Basic stack causes the screen RAM to be used instead of the "free" memory.

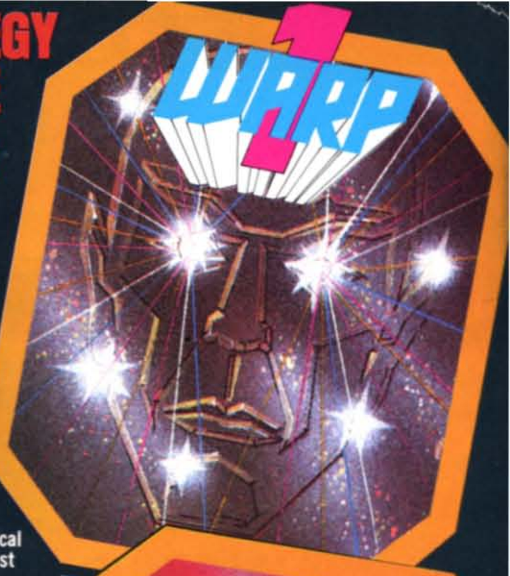
At the start of your program set HIMEM to &3000, and this should stop any stray pixels. If this is not done HIMEM will be left at &7C00 for Mode 7.

If Elite GOTO top of the class

```
 10 REM: ELITE
 20 REM: copyright
Conkersoft 1984
 30 IF up>10.00hrs AND
unemployed = TRUE
CHAIN"ELITE"
 40 ON ERROR GOTO250
 50 REPEAT
 60 PROCplay
 70 UNTIL joystickbreaks
 80 IF rating =
mostlyharmless AND  credits
> 50000 player = LIAR
 90 IF system = anarchy AND
missiles = 0 AND energy =
low THEN press H
100 PROChyperspace
110 PROCfit
120 IF missile GOTO
coriolisstation
130 REPEAT
laserattackingpoliceviper
140 UNTIL FALSE
150 ON
microvitec-coffeespilt
GOTO160
160 CLS
170 IF TIME = 3am GOTO bed
180 END
190 DEFPROChyperspace
200 IF thargoidsambush THEN
press TAB: THEN press
ESCAPE
210 ENDPROC
220 DEFPROCfit
230 militarylasers a.s.a.p
240 ENDPROC
250 IF podfitted GOTO
nearestplanet
260 RIGHT ON COMMANDER!!
```

All right, John? – **Steve (deadly) Clarke, Watton at Stone, Hertford.**





ARCADE, STRATEGY & ADVENTURE FOR BBC & ELECTRON

WARP 1...command a federation starship...seek out a fellow space captain who is lost in space and boldly go where no man has gone before.

"It's like no other game I've played before . . . screen layout is excellent - It's different". Electron User.
"Stylish graphics and a splendid hyper-space display". Pop. Comp. Weekly.

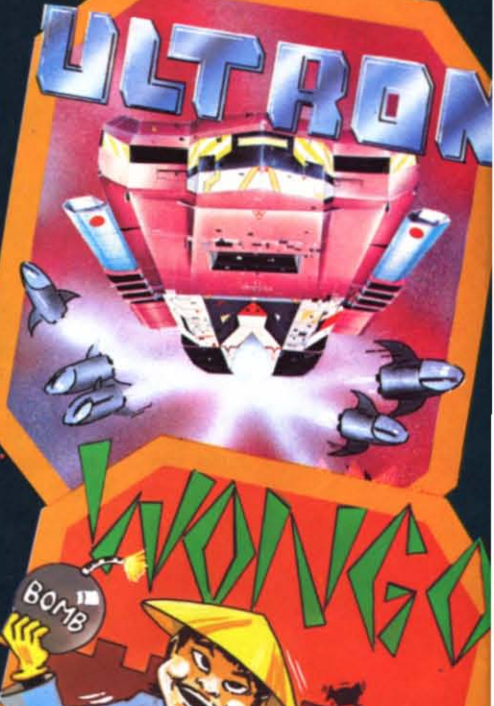
BBC £7.95. Electron £7.95

ZORAKK the conqueror...a graphical fantasy adventure in search of the lost crown of ultimate darkness.

"frustratingly addictive strategy game"
"utterly compulsive", better than most of the strategy games available for the beeb". Personal Computer Games.

BBC £7.95
Electron £7.95 Dragon £7.95

Merry Xmas
SANTA



Merry Xmas, SANTA... arcade fun as Santa delivers presents. Jump flying snowballs... dodge falling icicles...avoid hostile snowmen and eat and drink as much as possible on the way . Excellent full colour action which can be enjoyed all the year round.

BBC £7.95
48K Spectrum £5.95

Space Station ALPHA... a graphical space battle to save the earth from invading cylons.

"flying colours and realistic sounds" Printout.

BBC £7.95. Electron £7.95

ULTRON...Super fast, super smooth, 'zap-em' game, blast the swarms of invading aliens to reach the mother ship ...multi screen.

- BBC £7.95
Electron £7.95

WONGO...bounce along the Great Wall of China to diffuse sizzling bombs avoiding arrows, boulders and gremlins on the way. Multi screen increasing in difficulty and speed.

BBC £7.95 Electron £7.95

SPACE STATION
ALPHA

ICON SOFTWARE

Selected titles available from:
John Menzies, Co-op, Harrods,
Wildings, Granada TV and most
good computer shops.

Dealers contact: Centresoft, Express Marketing,
R & R comp. games.
Drakes and Tiger Distribution.

To order direct from us:
Send cheque or P.O. payable
to ICON or quote your
Access No.

65 HIGH STREET, GOSFORTH,
TYNE & WEAR, NE3 4AA.

Tel: (091) 2846966

THE COMPLETE GRAPHICS PACKAGE!

BEL CHARTS, BEL PLOT and (when supplied together) BEL GRAPH

POWERFUL AND SOPHISTICATED YET MENU DRIVEN AND EASY TO USE!
FOR THE AMATEUR AND PROFESSIONAL USER ALIKE!

- AUTOMATIC DRAWING and SCALING OF AXES WITH OPTIONAL SELF LABELLING FACILITIES, TITLES, etc. (Coarse/Fine Cursor movement).
- CONFIGURATION ALLOWS DISC DRIVE, FILE NAMES, SCREEN DUMP SELECTION.
- DATA ENTRY FROM FILE OR KEYBOARD INTO 4 FIELDS. (Range, All or Select Records from File)
- MINIMUM KEYSTROKES – Extensive use of FUNCTION KEYS
- COMPREHENSIVE EDIT FACILITIES – MOVE, DELETE, CHANGE, BROWSE
- SORT (Ascend/Descend) ON ANY FIELD
- RENAME FIELDS ETC., SAVE CONFIGURATIONS, DEFAULT VALUES
- SCREEN DUMP – ACCESS OWN ROM, APPEND OWN or SUPPLIED (FOR EPSON)
- SAVE/LOAD SCREENS
- TWO COLOUR MODE–CHANGE COLOURS IF REQUIRED
- TEST/FAMILIARISATION FILES AND FULL INSTRUCTION MANUAL

BEL CHARTS

Up to 3 Fields may be plotted against the 4th as Line Graphs, Bar Charts, Stacked Bar Chart or Histograms. (150 Data Points/Field).

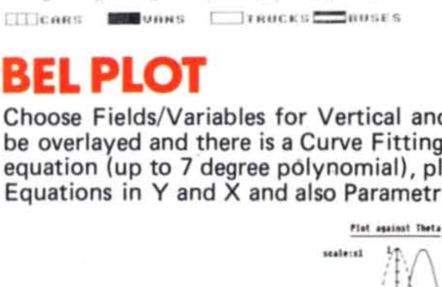
Charts may be plain or 3D and up to 24 Bars can be displayed.

Pie Charts may show the 4 Fields or have up to 10 segments using a special routine.

Bar and Pie Charts can be displayed together.

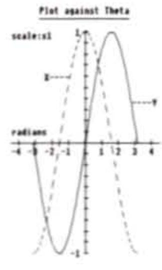
Plain, solid, line and striped shading.

Negative numbers catered for.

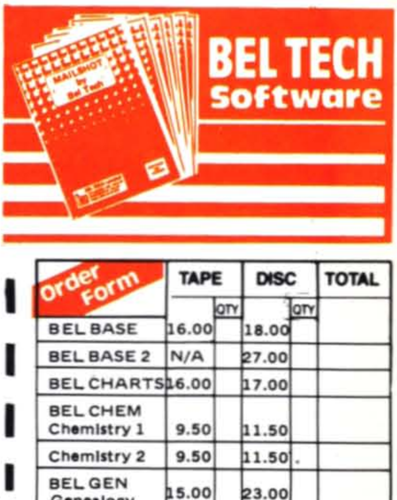


BEL PLOT

Choose Fields/Variables for Vertical and Horizontal Axes. Graphs may be overlayed and there is a Curve Fitting routine which gives the derived equation (up to 7 degree polynomial), plots it and shows the data points. Equations in Y and X and also Parametrics may be entered and plotted.



COMPATIBLE WITH BEL BASE 2, BEL BASE and MAILSHOT
Upgrade available for BEL GRAPH Registered Users.



Order Form	TAPE	QTY	DISC	QTY	TOTAL
BEL BASE	16.00		18.00		
BEL BASE 2	N/A		27.00		
BEL CHARTS	16.00		17.00		
BEL CHEM Chemistry 1	9.50		11.50		
Chemistry 2	9.50		11.50		
BEL GEN Genealogy	15.00		23.00		
BEL GRAPH	25.00		27.00		
BEL PLOT	16.00		17.00		
BEL SUBS	14.00		15.00		
MAILSHOT	9.50		11.50		

TOTAL inc. P. & P. £ ______

NAME ______

ADDRESS ______

______

______

COMPUTER TYPE ______ MODEL ______

DISC (if applic.) ______

CREDIT CARD No. PAYMENT BY CHEQUE, P.O., VISA, ACCESS

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Please Complete & Return to:-

BEL TECH Limited, College House,
St. Leonards Close, Bridgnorth,
Shropshire WV16 4EW

Telephone: 07462 5420 (24 Hrs.)

LOOK! . . .

THE BBC PERIPHERAL SPECIALISTS – FREE UK DELIVERY

PRINTERS

Cosmos JP-80	159
M. Tally MT80	165
Sakata MCP80	165
Epson RX80/FT	215
Riteman-2	239
Kaga KP810	249
Ensign 1650	259
Epson FX80	315
Juki 6100	315

CANON DISC DRIVES

Single 110 SS40T	75
Single 220 DS40/80T	125
Dual 110 SS40T	155
Dual 220 DS40/80T	265
Power supplies	25

SANYO DISC DRIVES

Single DS40/80T	135
Dual DS40/80T	265
Power supplies	25

CUMANA DISC DRIVES

Single CSX100 SS40T	95
Single CSX400 DS40/80T	140
Dual CD200 SS40T + psu	215
Dual CD800 DS40/80T + psu	315
Power supplies for single	20

TEAC DISC DRIVES

Single 100K SS40T	95
Single 400K DS40/80T	140
Dual 800K DS40/80T + psu	315
Power supplies for single	25

HITACHI 3" DISC DRIVES

Single 100K Flippable	109
Dual 200K Flippable	225
Power supplies	20

MONITORS

Microvitec 1431	169
Microvitec 1431/AP	199
Microvitec 1451	225
Microvitec 1451/AP	289

MISCELLANEOUS

Pace Modem + Commstar	119
UDM DDFS V.2.0	79
8271 chips	79
Parallel printer cable	9

BEEBUGSOFT

Sleuth	22
Toolkit	21
Spellcheck-2	24
Murom	22

COMPUTER CONCEPTS

Wordwise+	42
Disc Doctor	25
Graphics Rom	25
Caretaker	25
Printmaster	25

DISKETTES

Control Data SSDD40T	12
Control Data DSDD80T	20
3-M SSDD40T	14
3-M DSDD80T	24
Cumana DSDD80T	14
Maxell 3" discs(5)	19

GAMES SOFTWARE

Acornsoft	7.35/9.96
Elite etc	10.83/13.43
Micro Power	5.17/7.78
Superior	5.17/7.78
S. Invasion	5.17/7.78
3-D Grand P	6.91/9.52

Other games available.

UK – Please add 15% VAT. Delivery free. 24-hr delivery + £6. Europe – Just add 10%. World – Just add 20%

To order – Simply send a Cheque/PO with your order to:

J.B. International Microsystems
15 The Chestnuts, Hertford, Herts. SG13 8AQ.

For unbiased and unhurried advice on any products simply phone 0992 553184 and we will call you at the time of your choice – day or night!

. . . IT'S JBI!

BBC/ELECTRON 'IMAGE' V.2

'IMAGE' was the ultimate tape back-up copier now, it's even better

You can be completely assured that this is the best and most able program of its type available. It can deal with:

- Locked programs
- Programs of any length
- 300 and 1200 BAUD
- Files
- ?'s (Ctrl codes) in Filename
- Multiple copies
- False or trick block info.
- Changing Filename
- Continuous data streams
- Locking and unlocking programs

It is VERY IMPORTANT INDEED purchasers take note that **'IMAGE'** is for sale strictly for making **BACK-UPS** of your own software for your own use, for protecting your own programs, or as an aid to putting software on disk. Any person found using the program for illegal purposes runs the risk of being prosecuted.
To receive your copy of 'Image', send a cheque or P.O. to the sum of
An Astounding £4.80. to:

Peter Donn, Dept. (MU), 33 Little Gaynes Lane,
Upminster, Essex RM14 2JR.

Please state BBC or Electron version. V.1 owners can obtain V.2 by sending £1.50 + V.1 without case.

BEAM DESIGN

- For architects, engineers, surveyors, builders, etc.
- Analysis of simply supported beam with any combination of multiple point loads, u.d. loads and triangular loads.
- Steel beam design to BS.449 with selection of suitable single and double sections from standard range of RSJs, Channels, UBs and UCs.
- Timber design to CP.112 permits choice of species/grade and single, double or triple built-up members.
- Allows user to instantly switch between steel and timber modes and browse through the entire range of suitable sections.
- Output to printer for L.A. checking includes all loading data, reactions, max. bending moment, deflection and full details of chosen section(s).
- Separate graphics version displays BM and SF diagrams (but not steel or timber sections).
- Available for BBC model B. Cassette £40, disc £45.

Send large SAE for specification showing printout.
BEAMSCAN, 20 Vaughan Avenue, Hendon, London NW4 4HU.

We're a soft touch-for BBC micro ROM and DISC software

BBC MICRO ROM SOFTWARE

PRODUCT CODE		ROM PRICE INC VAT	
1000	View Word Processor – Acorn	58.00	☐
1001	Viewsheet Spreadsheet – Acorn	58.00	☐
1002	1.2 Operating System – Acorn	10.00	☐
1003	Basic 2 for BBC Micro – Acorn	34.00	☐
1004	DNFS Chip (DFS 1.20-NFS 3.60) – Acorn	28.75	☐
1010	Wordwise – Computer Concepts	42.00	☐
1011	Disc Doctor – Computer Concepts	32.00	☐
1012	Termi – Computer Concepts	32.00	☐
1113	Graphics – Computer Concepts	32.00	☐
1114	Gremlin – Computer Concepts	32.00	☐
1115	Printmaster – Computer Concepts	32.00	☐
1116	Caretaker – Computer Concepts	32.00	☐
1117	Communicator – Computer Concepts	65.00	☐
1125	Toolkit – Beebugsoft	26.00	☐
1126	Exmon – Beebugsoft	26.00	☐
1130	Datagem Database – Gemini	125.00	☐

BBC MICRO DISC SOFTWARE

PRODUCT CODE		DISC PRICE INC VAT	
1170	Spellcheck – View 40T Beebugsoft	18.00	☐
1171	Spellcheck – Wordwise 40T Beebugsoft	18.00	☐
1174	Masterfile – Beebugsoft 40T	18.00	☐
1175	Masterfile – Beebugsoft 80T	18.00	☐
1176	Design – Beebugsoft 40T	18.00	☐
1178	Teletext – Beebugsoft 40T	12.00	☐
1185	Inv & Sales Ledger Accounts – Gemini	98.00	☐
1190	B-Base – Clares	24.00	☐
1192	Replica II – Clares	12.00	☐
1194	The Key – Clares	12.00	☐
1200	Bel Base + Mailshot – Bel Tech	18.00	☐
1210	Mini Office – Database Pub 40T	7.95	☐
1211	Mini Office – Database Pub 80T	7.95	☐

Please tick (✓) each item required. If more than one required, state number.

I enclose Cheque/P.O. for £ ……………………………………
Add Postage & Packing up to 3 items £1.00 for UK, £3.00 for Overseas. For 3 to 6 items, add £2.00 for UK, £6.00 for overseas. Personal callers always welcome.
I prefer to pay ACCESS/BARCLAYCARD (Delete as necessary)

Card Number ……………………………………

Name ……………………………………

Address ……………………………………

……………………………………

……………………………………

Open from 9 – 5 weekdays, 9 – 5 Saturdays
Prices subject to change without notice and subject to availability.

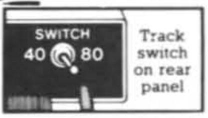
Viglen

Post to VIGLEN COMPUTER SUPPLIES SOFTWARE DEPARTMENT
UNIT 7, TRUMPERS WAY, HANWELL, LONDON W7 2QA

At Viglen COMPUTER SUPPLIES the choice is yours

First class 400K single & 800K dual (40/80) switchable drives by

MITSUBISHI, CANON AND EPSON Slimline Drives



SWITCH
40 80
Track switch on rear panel

Replacing cassettes with disc drives means programme loaded and data accessed in seconds not minutes. Our guaranteed disc drives are supplied with a comprehensive fact-filled 53 page manual, exclusive to Viglen, which shows loading from cassette to disc and other information for the BBC Model B.

MITSUBISHI, CANON AND EPSON SLIMLINE DRIVES

All disc drives are supplied complete with Professional Case - Ribbon Cable to connect to BBC Micro - Power Cable to BBC Micro - Comprehensive Manual - Formatting and utilities disc, which includes 13 useful utilities including * formatting * verifying * screen dump * disassembler * generating 62 files, etc.

The drives below are available in the following makes: MITSUBISHI M4853 (very latest LSI with self centering)* CANON 6138B (very latest model) and EPSON SD540 * For TEAC and TEC models see other Viglen advert.

	Incl. VAT	Excl. VAT		Incl. VAT	Excl. VAT
Single Drives			**Dual Drives**		
40/80 Track 400K Double Sided Switchable	£149.00	£129.56	40/80 Track 800K Double Sided Switchable	£298.00	£259.13
Integral Power Supply for Single Drive	£18.00	£15.63	Integral Power Supply for Dual Drive	£36.00	£31.30
Additional Charge for Single Drive in Dual Case with Dual Drive Power Supply	£49.00	£42.61	External Cased Power Supply capable of driving Dual Slimline Drives	£45.00	£39.13

Please Ring 01-843 9903 for LATEST PRICES

FULL TWELVE MONTHS GUARANTEE

- Orders welcomed from Educational Establishments and Government Departments

HOW TO ORDER

By post: To purchase any of the items simply fill in the coupon with your requirements.
Enclose your Cheque/P.O. or use your Access/Barclaycard. Please make cheques payable to VIGLEN COMPUTER SUPPLIES and post to above address. Add £12 for delivery, inc. insurance. Usually despatched next day.

By telephone: Ring (01) 843 9903 Credit Card holders (Access/Barclaycard only) can purchase by telephone. Please give Card No., Name, Address and the items required.

All prices correct at time of going to press and all offers subject to availability.

ACORN DFS also available. Free fitting with Viglen drives £98

Post to: VIGLEN COMPUTER SUPPLIES UNIT 7, TRUMPERS WAY, HANWELL W7 2QA.
Telephone: 01-843 9903. Personal Callers Welcome. **MU3/1**

VIGLEN
BOSTON MANOR

AMPLE ON-THE-SPOT
CAR PARKING
- AND IT'S FREE!

Please send me
(state quantity and make). ____________

I enclose Cheque/P.O. for £ ____________ *Inc. £12 carriage.*

I prefer to pay ACCESS/BARCLAYCARD *(Delete whichever is not applicable)*

Card No. ____________ Signature ____________

Name ____________

Address ____________

Viglen
COMPUTER SUPPLIES
UNIT 7 Trumpers Way,
Hanwell W7 2QA.
Telephone 01-843 9903.
Open 9.30am-6pm. Mon-Fri.
9.30am-4pm. Sat.

SIMPLE TO USE
Viglen

The only ROM Cartridge System that does not overload your pocket or your BBC Micro

Why risk damage to your BBC micro every time you want to change ROM's? Instead, store your growing collection of ROM's in professionally-made protective cartridges!

- ○ *All cartridges are gold-plated for durability and reliability.*
- ○ *No need to switch machine off between cartridge changes.*
- ○ *Insert and remove 'Wordwise' 'View' 'Disc Doctor', etc., at will, from your micro in absolute safety.*
- ○ *Low, low power consumption unlike other systems.*
- ○ *Save on memory.*
- ○ *Price for complete kit, including cartridge only £15.95.*
- ○ *Cartridges at £2.95 each.*
- ○ *Four for £11.00 (ie £2.75 each).*
- ○ *Ten for £26.50 (ie £2.65 each).*
- ○ *Kit comes with 1 ROM cartridge, 1 Cable Assembly, 1 Blanking Off Plate (used if system is removed).*
- ○ *1 Socket Cover (used when no cartridges are resident to protect against dust).*
- ○ *1 Cartridge Rack (stores cartridges safely when not in use, also expands to a Library System).*
- ○ *All prices inc. VAT.*

EASY TO INSTALL
Viglen

Viglen
COMPUTER SUPPLIES
UNIT 7 Trumpers Way,
Hanwell W7 2QA.
Tel 01-843 9903.

Post to VIGLEN COMPUTER SUPPLIES UNIT 7, TRUMPERS WAY, HANWELL W7 2QA.
Telephone: 01-843 9903. Personal Callers Welcome
I enclose Cheque/P.O. for £______ Please add £2.50 for postage and packing
Please send me (state number required) ______ (50p only for single cartridge) ______ Kits ______ Cartridges
I prefer to pay ACCESS/BARCLAYCARD (Delete whichever is not applicable)
Card No. ______
Credit Cards valid if signed by Cardholder. Address below must be the same as card holders
Signature ______
Name ______
Address ______

Cheques payable to Viglen Computer Supplies
MU3/2

TEAC 400K DISK DRIVE & ACORN DFS

SWITCH
40 80
Track switch on rear panel
The Viglen Disc Manual For BBC Microcomputer Users
Viglen
40
Viglen

This Offer includes the latest 1.2 version of ACORN Interface DNFS

COMPLETE DISK SYSTEM FOR THE BBC MODEL B

- Package assumes you own a BBC Model B with 1.2 operating system.

OFFER INCLUDES:

- Disk Interface (call at factory for free fitting while you wait) or supplied with easy to fit instructions.
- 400K 40/80 track double-sided Teac Disk Drive (Model FD55F) including case and all leads.
- Comprehensive fact filled, 53 page manual including techniques of loading from cassette to disk. Not available elsewhere.
- Utilities Disk including formatting, verifying, BASIC program comparator, disassembler, Epson screen dump, dual catalogue (giving 62 files), large printing and others.

VIGLEN
BOSTON MANOR

Full Twelve Months Guarantee

Please Ring 01-843 9903 for LATEST PRICES

DISK DRIVE & ACORN INTERFACE £255 INC VAT

Viglen
COMPUTER SUPPLIES
UNIT 7 Trumpers Way,
Hanwell W7 2QA.
Telephone 01-843 9903.

AMPLE ON-THE-SPOT CAR PARKING – AND IT'S FREE!

OPEN
9.30am-6.0pm Mon-Fri.
9.30am-4.00pm Sat.

Prices correct at time of going to press – offer subject to availability

Post to: VIGLEN COMPUTER SUPPLIES UNIT 7, TRUMPERS WAY, HANWELL, W7 2QA.

Please send me ____ (Qty) TEAC 400K + DNFS at £267 (includes £12 carriage, usually despatched next day)

I enclose Cheque/P.O. for £ ____ made out to VIGLEN COMPUTER SUPPLIES

I prefer to pay ACCESS/BARCLAYCARD

(Delete whichever not applicable) Card No. ____

Signature ____

Name ____

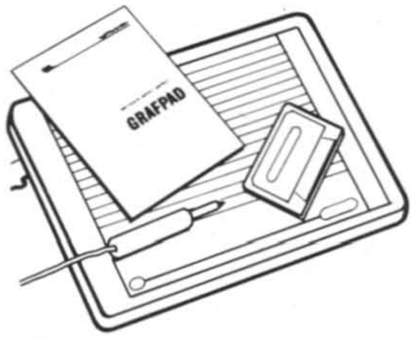
Address ____

MU3/4

SPECIAL OFFER FROM VIGLEN

✱ Scoop Viglen price £99·00 inc. VAT
£86·10 ex. VAT

✱ Normally sold at £143.75
✱ Special purchase



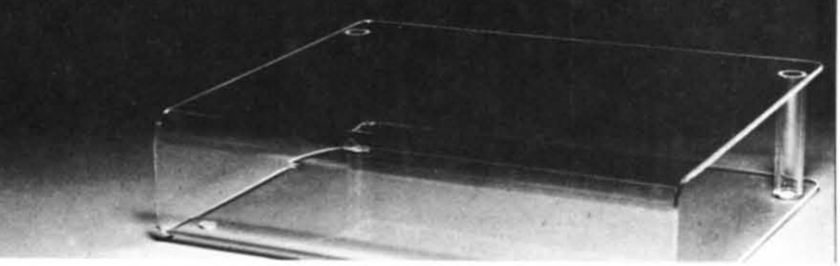
This remarkable Grafpad from British Micro allows you to input information into your computer – very accurate and high resolution, not to be confused with other models which are both more expensive and less accurate. Supplied with all necessary cables, manual and sample programs, to allow you to develop your own application programmes.

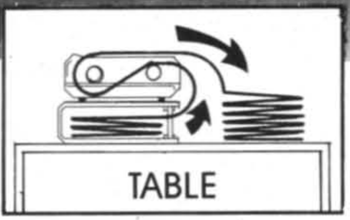
Computer aided design programme. Drawing programme etc.

SEE OTHER VIGLEN ADVERTS ON HOW TO ORDER

NEW! from Viglen COMPUTER SUPPLIES

A PRINTER STAND





- For 80 column matrix printers
- Raises printer high enough to put continuous stationery underneath
- Beautifully finished in clear perspex ● Viglen quality every time
- Will accept paper up to 12½" wide ● Non slip rubber pads

Dimensions: 15" (380mm) wide (320mm) deep 4" (90mm) high
Also available 136 column stand @ £27 inc. VAT.

Printer Stand
£14·95 INC. VAT
Carriage & Packing £3.00

COME TO VIGLEN FOR A FAST, FRIENDLY, PERSONAL SERVICE

DEALER ENQUIRIES WELCOME

MU3/5

Post to: VIGLEN COMPUTER SUPPLIES, UNIT 7, TRUMPERS WAY, HANWELL, LONDON W7 2QA.

Please send me ________ (qty) PRINTER STANDS at £17.95 each. I enclose Cheque/P.O. for £ ________ made out to

VIGLEN COMPUTER SUPPLIES or debit my ACCESS/BARCLAYCARD No. ________

Name ________ VISA Signature ________

Address ________

Put an end to inefficient, slow cassette tape storage

Speed your data access with a TEAC disk drive from Viglen

COMPUTER SUPPLIES
TEC DRIVES (as used by Cumana) also available at same prices
Comprehensive, fact-filled, 53 page manual including techniques of loading from cassettee to disc. Not available elsewhere
ACORN DFS also available. Free fitting with Viglen drives £98
Viglen
SWITCH
40 80
Track switch on rear panel

Replacing your cassette with a disk drive means data access in seconds! Prices include VAT, Formatting Disk, User Manual, Case and Leads.

All disk drives are supplied complete with Ribbon Cable to connect to BBC Micro - Power Cable to connect to • BBC Micro - Comprehensive Manual - Formatting and utilities disc which includes 13 useful utilities including • formatting • verifying • screen dump • disassembler • generating 62 files, etc.

SINGLE DRIVES	Incl VAT	Excl VAT	DUAL DRIVES	Incl VAT	Excl VAT
40 TRACK 100K	£119.00	£103.45	40 TRACK 200K	£238.00	£206.96
SINGLE SIDED 40/80 TRACK 200K SINGLE SIDED	£129.00	£121.17	SINGLE SIDED 40/80 TRACK 400K SINGLE SIDED	£258.00	£224.35
SWITCHABLE 40/80 TRACK 400K DOUBLE SIDED SWITCHABLE	£159.00	£138.27	SWITCHABLE 40/80 TRACK 800K DOUBLE SIDED SWITCHABLE	£318.00	£276.58
INTEGRAL POWER SUPPLY FOR SINGLE DRIVE	£18.00	£15.63	INTEGRAL POWER SUPPLY FOR DUAL DRIVE	£36.00	£31.30
SUPPLEMENT FOR SINGLE DRIVE IN DUAL CASE WITH DUAL DRIVE POWER SUPPLY	£49.00	£42.61	EXTERNAL CASED POWER SUPPLY capable of driving Dual Slimline Drives	£45.00	£39.13

Viglen
COMPUTER SUPPLIES
UNIT 7 Trumpers Way,
Hanwell W7 2QA.
Tel 01-843 9903.

All prices correct at time of going to press and all offers subject to availability.

VIGLEN
BOSTON MANOR

—Full Twelve— Months Guarantee

- Orders welcomed from Educational Establishments and Government Departments.

How to order

By post: To purchase any of the items simply fill in the coupon with your requirements. Enclose your Cheque/P.O. or use your Access/Barclaycard. Please make cheques payable to: VIGLEN COMPUTER SUPPLIES and post to above address. Please add £12 for carriage. Order usually despatched within next day.

By telephone: Ring (01) 843 9903. Credit Card holders (Access/Barclaycard only) can purchase by telephone. Please give Card No., Name, Address and the items required.

EASY ON-THE-SPOT PARKING, AND IT'S FREE! OPEN 9.30 am-6.0 pm Mon-Fri 9.30 am-4.0 pm Sat

Post to: VIGLEN COMPUTER SUPPLIES UNIT 7, TRUMPERS WAY, HANWELL, W7 2QA 01-843 9903

Please send me the following items:

I enclose Cheque/P.O. for £ ______ Add £12 carriage. *Delete as necessary

I prefer to pay by ACCESS/BARCLAYCARD.* Card No:

Signature

Name

Address

PHILIPS COMPUTER MONITORS

From Viglen
COMPUTER SUPPLIES

DON'T BUY

just a colour monitor when you can have this New Philips TV + Monitor for only

£225
INC. VAT

ONLY
£85
INC. VAT

PHILIPS BM 7502 GREEN SCREEN MONO

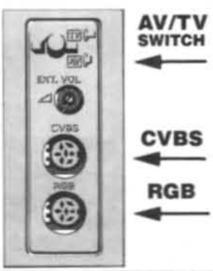
From the highly successful 'Philips 80 Range', here is a monitor specially designed to display graphics and alphanumeric data with perfect clarity.

- 12" high resolution, 20MHz band width, anti-glare screen
- RGB, Composite Video (CVBS) and Audio Input
- 2000 character (80 × 25) display
- Swivel base available £13.95 incl. VAT
- Suitable for the following computers:
  BBC B (free leads supplied for the Beeb); Apple II, IIE, II plus Apple III; Atari 600XL, 800, 800XL, 1450XL; Coleco Adam; Commodore Vic20, Vic64; IBM-PC with interface; Texas Instruments T199/4A; Timex Sinclair; Einstein; QL

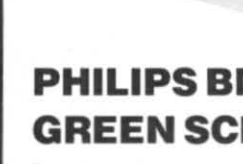
PHILIPS CT 2007 COLOUR TELEVISION + MONITOR

This very popular unit is not only an excellent Colour Television Receiver, but also a sophisticated computer monitor. Featuring:

- Free lead supplied for BBC Micro
- Headphone socket and speaker mute switch
- RGB, (TTL and can be modified for linear), Composite Video Input (CVBS), Audio Input plus this model has an AV/TV switch
- 14" picture tube with 0.65mm resolution
- Maximum 80 characters per line 20MHz band width
- 12 pre-select buttons
- Aerial supplied
- Swivel base extra £13.95 inc. VAT



Open 9.30 – 6 weekdays,
9.30 – 4 Saturdays



—Full Twelve— Months Guarantee

HOW TO ORDER

BY POST: To purchase either of the items in this advertisement simply fill in the coupon with your requirements. Enclose your Cheque/P.O. or use your Access/Barclaycard. Please make cheques payable to VIGLEN COMPUTER SUPPLIES and post to the address on the coupon. Add £8.00 for Postage, Packing and Insurance for each item. Prices subject to change without notice.

BY TELEPHONE: Ring (01) 843 9903. Credit Card holders Access/Barclaycard can purchase by telephone. Please give Card No., Name, Address and the items required.

Post to: VIGLEN COMPUTER SUPPLIES, UNIT 7, TRUMPERS WAY,
HANWELL W7 2QA Telephone 01-843 9903. Personal callers always welcome.

Please send me ....
I enclose Cheque/P.O. for £.......... incl. £8 carriage. Payable to Viglen Computer Supplies.
I prefer to pay by ACCESS/BARCLAYCARD (Delete whichever is unapplicable).
Card No: ....
Signature: ....
Name: ....
Address: ....
....
....

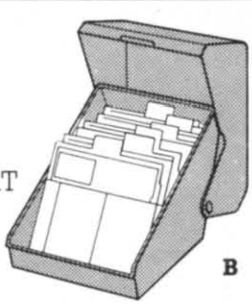
The BBC Model B
All the peripherals from Viglen
The best service-The best value

Disk Storage No.1

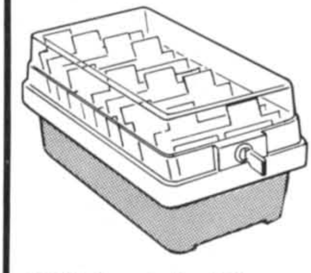
This diskette storage holds 70 diskettes

Our **Super Low** price

£14.95 including VAT



B



Disk Storage No.2

B

This lockable diskette box holds 90 diskettes

Super Low price

£14.85 inc. VAT

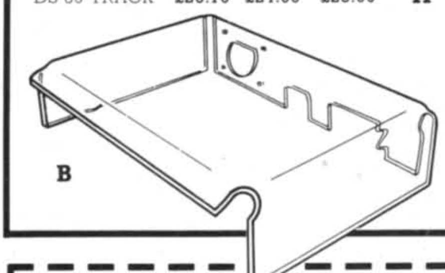
3M Scotch Disc

5¼″ diskettes single sided

	1-2 boxes	3-9 boxes	10+ boxes
SS 40 TRACK	£15.00	£13.50	£13.00
DS 40 TRACK	£20.00	£18.40	£17.70
SS 80 TRACK	£23.00	£20.70	£20.00
DS 80 TRACK	£26.70	£24.00	£23.00

A

10 DISCS PER BOX



B

Monitor Stand

Our **Super Low** price

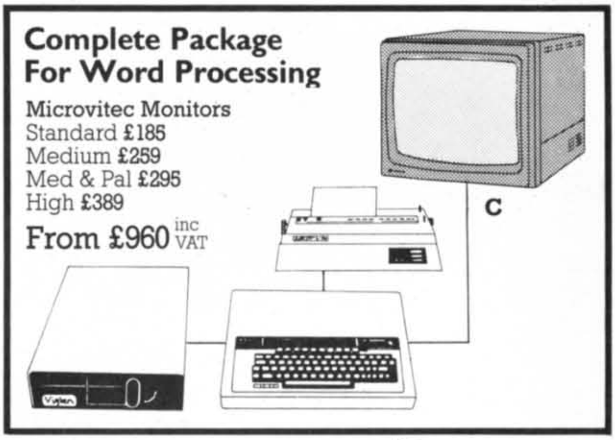
£14.95

inc. VAT

Complete Package For Word Processing

Microvitec Monitors
Standard **£185**
Medium **£259**
Med & Pal **£295**
High **£389**

From £960 inc VAT



C

Dot Matrix Printers

Taxan Kaga KP810 **£301**
Canon PW1080A **£321**
Epson RX80/FT **£275**
Epson FX80 **£389**
Shinwa CPA80 (100cps) **£219**
Mannesmann Tally MT80 **£209**

C

Daisy Wheel Printers

Juki 6100 **£385**
Quen Data **£255**

C

Please add £8 for 1½ metre length printer lead for the BBC micro.

BBC Model B £359 C

BBC Model B + DNFS (latest 1.2 pts) £439

All prices inc. VAT
Please add for carriage.
A - £2. **B** - £3. **C** - £8.

Post to: VIGLEN COMPUTER SUPPLIES. UNIT 7, TRUMPERS WAY, HANWELL W7 2QA Telephone: 01-843 9903.

Please send me ____________________

I enclose Cheque/P.O. for £__________ Incl. carriage.
Cheques payable to Viglen Computer Supplies.

Name ____________________

Address ____________________

Credit cards valid only if signed by card holder. Address must be the same as card holder.

I prefer to pay by ACCESS/BARCLAYCARD
(Delete whichever is not applicable)

Card No. ____________________

Signature ____________________

THE MICRO USER MAIL ORDER OFFERS

SAVE £10

ON THE INCREDIBLE

AMX MOUSE

No wonder the computer press has greeted the arrival of the AMX Mouse with rave reviews. For the first time it gives the BBC Micro advanced facilities until now only available on far more expensive machines such as the Apple Macintosh.
For beginners it's an ideal introduction to such sophisticated techniques as icons, windows, pull-down menus, spray cans and other devices for creating your own on-screen pictures. And with this special offer from *The Micro User* comes a package of software that opens up a wide range of other uses. ***This is a limited offer – so don't delay in placing your order.***

Complete package consists of:

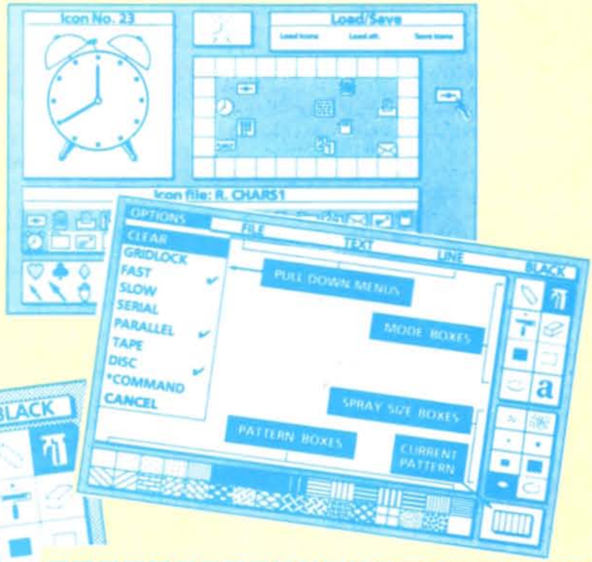
AMX Mouse
AMX Rom
AMX Art
Icon Designer

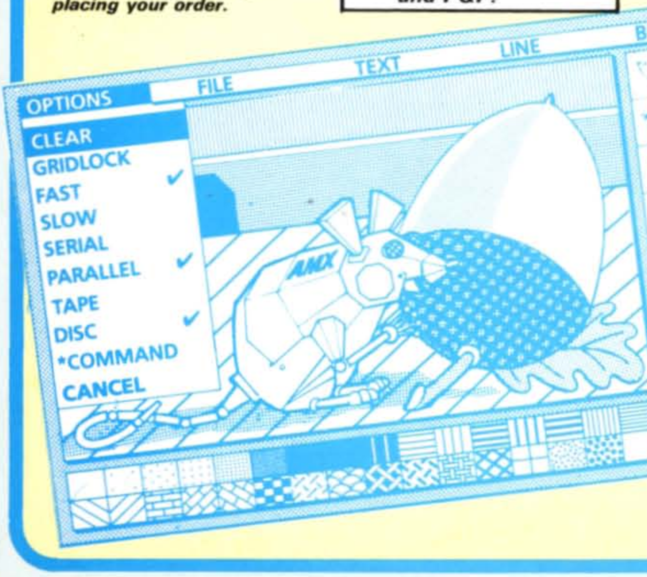
Purchasers will receive software on cassette and either 3in or 5¼in 40 track disc. Please state preference on order form.

ONLY

£79.95

Including VAT and P&P.


Icon No. 23
Load/Save
Load icons
Load alt.
Save icons
Icon file: R. CHARS1
OPTIONS
FILE
TEXT
LINE
BLACK
CLEAR
GRIDLOCK
FAST
SLOW
SERIAL
PARALLEL
TAPE
DISC
*COMMAND
CANCEL
PULL DOWN MENUS
MODE BOXES
SPRAY SIZE BOXES
PATTERN BOXES
CURRENT PATTERN


OPTIONS
FILE
TEXT
LINE
BLACK
CLEAR
GRIDLOCK
FAST
SLOW
SERIAL
PARALLEL
TAPE
DISC
*COMMAND
CANCEL
AMX

Please send me the complete AMX Mouse package at the special price of £79.95. (Includes VAT, post and packing.)

☐ I enclose a cheque/PO for £______ made payable to Database Publications Ltd.

☐ I wish to pay by ☐ Access ☐ Visa

No. ____________ expiry date ____________

Signed ________________________

Name ________________________

Address ________________________

SAVE £10 on normal prices

Post to: Mouse Offer, Database Publications Ltd, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Please allow 28 days for delivery

THE MICRO USER MAIL ORDER OFFERS

Give your micro the power of SPEECH!

You've heard of computer feedback, now try computer talkback with our low cost offer on the official Acorn speech extension.

★ 164 words and word parts from which you can construct your own new sounds with ease.
★ Simple to use from Basic – each word is called via its own unique reference number used with the SOUND –1 command.
★ Quick and easy to install. For full speech capability simply insert two chips. (Also included is a socket for plug in cartridges. This will require a little skill at soldering, but is not necessary for the basic speech function.)
★ Suitable for all BBC Micros with Version 4 boards or later. (Pack includes technical details on how to modify earlier versions.)
★ Easy-to-understand instruction manuals included.
★ A decent British accent – Kenneth Kendal at his best.

SAVE £25 off the recommended retail price of £55

At only £29.95 it's an offer you really shouldn't miss. Make sure of yours today.

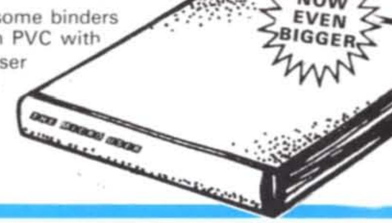
Your BBC Micro needs protecting!

ONLY £3.95

Our luxury dust cover is made of soft pliable water-resistant transparent vinyl, bound with strong cotton and decorated with the *Micro User* logo in black.

Keep your copies neat and complete

NOW EVEN BIGGER



These handsome binders are bound in PVC with the Micro User logo in gold blocking on the spine.

only
£4.25
(UK)

Upgrade to Basic II for a very special price!

ONLY £23.50

This is what you get with Basic II:

- More accurate calculations.
- An extra file handling command, OPENUP.
- The invaluable OSCLI command, allowing you, for example, to *LOAD files with a variable as the file parameter.
- EVAL will work with PAGE, HIMEM and other pseudo-variables.
- The INSTRing bug has been corrected.
- More efficient handling of string memory.
- EQUB, EQUD and EQUW – invaluable in assembler.
- 0% combined with extra values of OPT to enable offset assembly.

Don't miss this exceptional offer

The Advanced User Guide *is the essential companion for the BBC Micro . . . with 512 information-packed pages*

Featured in its 512 pages are:
★ the BASIC Assembler
★ 6502 machine code reference section
★ complete descriptions of all FX calls
★ BBC memory usage and vectors explained
★ full interfacing details for the user port, tube, analogue port, 1 MHz bus
★ paged ROMs explained ★ and lots, lots more.

With many examples to illustrate the text, this guide is the indispensable reference work for the serious BBC Micro programmer.

£11.50

Assembly Programming Made Easy *puts the magic world of machine code at your finger-tips*

Here is a really easy guide for the enthusiastic beginner to assembly language for the BBC Micro. Using easy examples, cartoons and short, very simple programs you will quickly learn how to put graphics on the screen, use the BBC operating system and bring the machine to life.

£4.95

To make learning assembly language even easier send for the combined book and tape cassette containing all the programs.

£6.95

BARGAIN OFFER! FOUR classic games for only £1.50 each

COMPENDIUM OF CLASSIC ARCADE GAMES

This package contains four rip-roaring games for the Electron and BBC Micro

Three of this high-powered collection are top-rate machine-code versions of arcade classics and the fourth is a thrilling real-time adventure game. There's hours of enjoyment and something to suit everyone in this unique value for money collection.

SNAPMAN – Guide your man through the maze as he munches energy pellets and avoids hostile aliens.

ALIEN INTRUDERS – With only your laser for protection you must destroy the waves of aliens who threaten to engulf you.

PANZER ATTACK – You are a tank commander engaged in vicious combat against encircling enemy forces.

MAYDAY – A futuristic adventure! As captain of an interstellar cruiser you must guide the sole survivor of a stricken space freighter through the wreckage of his craft. If you fail to recover those vital medical supplies a whole planet is doomed!

Electron tape	£5.95
BBC tape	£5.95
BBC disc 5¼"	£7.95
BBC disc 3"	£9.95

Also on 3" disc

Go for gold with the...

MICRO OLYMPICS

11 great track and field events for only . . .

£5.95	£7.95	£9.95
cassette	5¼ disc	3″ disc

YOU are challenged to beat the Olympic world records – with the packed stadium cheering you on to victory . . . or defeat!

Just like the real thing, you'll want to keep on improving your skill until you're up there among the greats!

MICRO OLYMPICS is more than a game. It's a brilliantly written collection of ELEVEN track and field events.

And because they're selling in their thousands we've been able to bring the price right down – to just £5.95.

Ever imagined yourself as another Seb Coe? Then try to run against the world record holder at 1500 metres. And if that distance is too much for you then there's always the 100, 200, 400 and 800 metres to have a go at.

Not much good at running? Don't worry, MICRO OLYMPICS has many more challenges for you. Why not try your skill at the high jump or the long jump?

And if you can't beat the computer at running or jumping then you can always throw things around in frustration! The trouble is that it's just as hard to be a champion at the discus, the hammer or the javelin.

Also on 3″ disc

And the pole vault takes the event to new heights!

Yes, it's fast, furious fun, pitting yourself against the world's best times and distances on your micro.

You may not be another Steve Ovett or Alan Wells, but with practice you COULD become the Micro Olympics Champion!

Our monthly games tape/disc now has an extra free game

This month play the full length arcade game . . .

FLEX

Details on Page 119

Also on 3″ disc

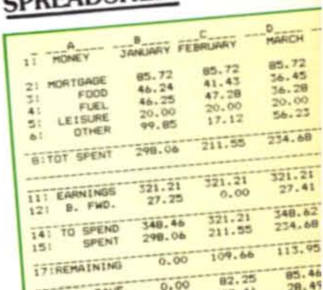
Use the special order form on Page 7 – No stamp needed!

QUICK TO LEAR

THAT'S...

MINI OFFICE

SPREADSHEET



```
    ___A____   __B_____  ___C____  ___D____
 1:  MONEY     JANUARY  FEBRUARY    MARCH

 2: MORTGAGE     85.72     85.72    85.72
 3:     FOOD     46.24     41.43    36.45
 4:     FUEL     46.25     47.28    36.28
 5:  LEISURE     20.00     20.00    20.00
 6:    OTHER     99.85     17.12    56.23
-------------------------------------------
 8:TOT SPENT    298.06    211.55   234.68
-------------------------------------------

-------------------------------------------
11: EARNINGS    321.21    321.21   321.21
12:  B. FWD.     27.25      0.00    27.41
-------------------------------------------
14: TO SPEND    348.46    321.21   348.62
15:    SPENT    298.06    211.55   234.68
-------------------------------------------
17:REMAINING      0.00    109.66   113.95
-------------------------------------------
19:     SAVE      0.00     82.25    85.46
20:   C.FWD.      0.00     27.41    28.49
```

JUST LOOK WHAT THIS PACKAGE CAN DO!

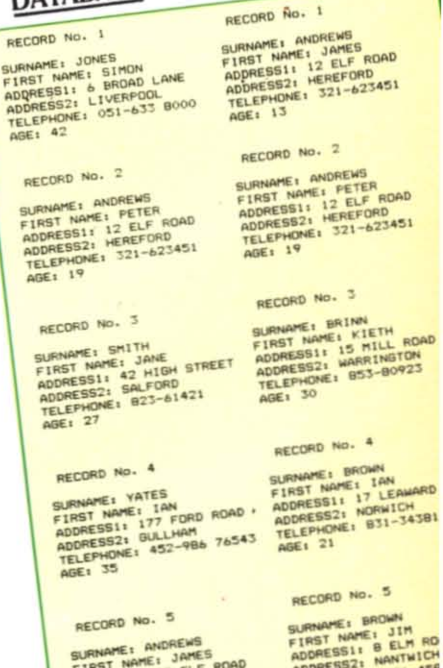
WORD PROCESSOR – Ideal for writing letters or reports! *Features:* Constant time display ● Constant word count (even shows words per minute) ● Normal or double-height text on screen or printout.

SPREADSHEET – Use your micro to manage your money! *Features:* Number display in rows and columns ● Continuous updating ● Update instantly reflected throughout spreadsheet ● Save results for future amendments.

GRAPHICS – Turn those numbers into an exciting visual display! *Features:* 3D bar chart ● Pie chart ● Graph.

DATABASE – Use it like an office filing cabinet! *Features:* Retrieve files at a keystroke ● Sort ● Replace ● Save ● Print ● Search.

DATABASE



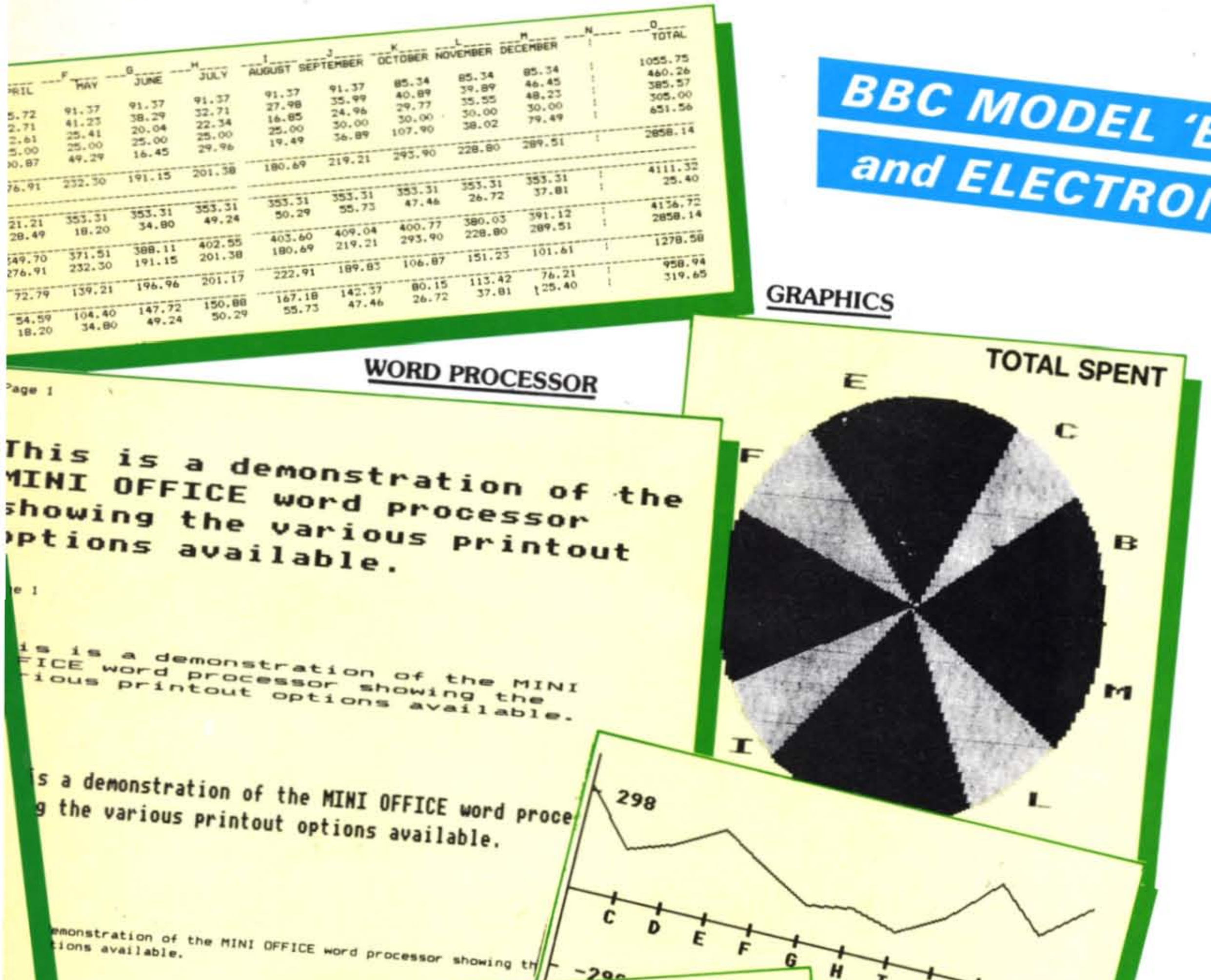
```
RECORD No. 1

SURNAME: JONES
FIRST NAME: SIMON
ADDRESS1: 6 BROAD LANE
ADDRESS2: LIVERPOOL
TELEPHONE: 051-633 8000
AGE: 42

RECORD No. 2

SURNAME: ANDREWS
FIRST NAME: PETER
ADDRESS1: 12 ELF ROAD
ADDRESS2: HEREFORD
TELEPHONE: 321-623451
AGE: 19

RECORD No. 3

SURNAME: SMITH
FIRST NAME: JANE
ADDRESS1: 42 HIGH STREET
ADDRESS2: SALFORD
TELEPHONE: 823-61421
AGE: 27

RECORD No. 4

SURNAME: YATES
FIRST NAME: IAN
ADDRESS1: 177 FORD ROAD
ADDRESS2: GULLHAM
TELEPHONE: 452-986 76543
AGE: 35

RECORD No. 5

SURNAME: ANDREWS
FIRST NAME: JAMES
ADDRESS1: 12 ELF ROAD
ADDRESS2: HEREFORD
TELEPHONE: 321-623451
AGE: 13

RECORD No. 1

SURNAME: ANDREWS
FIRST NAME: JAMES
ADDRESS1: 12 ELF ROAD
ADDRESS2: HEREFORD
TELEPHONE: 321-623451
AGE: 13

RECORD No. 2

SURNAME: ANDREWS
FIRST NAME: PETER
ADDRESS1: 12 ELF ROAD
ADDRESS2: HEREFORD
TELEPHONE: 321-623451
AGE: 19

RECORD No. 3

SURNAME: BRINN
FIRST NAME: KIETH
ADDRESS1: 15 MILL ROAD
ADDRESS2: WARRINGTON
TELEPHONE: 853-80923
AGE: 30

RECORD No. 4

SURNAME: BROWN
FIRST NAME: IAN
ADDRESS1: 17 LEAWARD
ADDRESS2: NORWICH
TELEPHONE: 831-34381
AGE: 21

RECORD No. 5

SURNAME: BROWN
FIRST NAME: JIM
ADDRESS1: 8 ELM RO
ADDRESS2: NANTWICH
TELEPHONE: 681-45
AGE: 11
```

...and it's all at

Available at W.H. SMITH, LASKYS, BOOTS and many other stores and deale

N, EASY TO USE

BBC MODEL 'B' and ELECTRON



```
----  ---F---  ---G---  ---H---  ---I---  ---J------ ---K----- ---L---- ---M---- ---N---- ---O---
PRIL    MAY     JUNE     JULY    AUGUST   SEPTEMBER   OCTOBER  NOVEMBER DECEMBER     :     TOTAL

5.72    91.37    91.37    91.37    91.37    91.37    85.34    85.34    85.34     :     1055.75
2.71    41.23    38.29    32.71    27.98    35.99    40.89    39.89    46.45     :      460.26
2.61    25.41    20.04    22.34    16.85    24.96    29.77    35.55    48.23     :      385.57
5.00    25.00    25.00    25.00    25.00    30.00    30.00    30.00    30.00     :      305.00
0.87    49.29    16.45    29.96    19.49    36.89   107.90    38.02    79.49     :      651.56
----------------------------------------------------------------------------------------------
76.91   232.30   191.15   201.38   180.69   219.21   293.90   228.80   289.51     :     2858.14
----------------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------------
21.21   353.31   353.31   353.31   353.31   353.31   353.31   353.31   353.31     :     4111.32
28.49    18.20    34.80    49.24    50.29    55.73    47.46    26.72    37.81     :       25.40
----------------------------------------------------------------------------------------------
549.70  371.51   388.11   402.55   403.60   409.04   400.77   380.03   391.12     :     4136.72
276.91  232.30   191.15   201.38   180.69   219.21   293.90   228.80   289.51     :     2858.14
----------------------------------------------------------------------------------------------
72.79   139.21   196.96   201.17   222.91   189.83   106.87   151.23   101.61     :     1278.58
----------------------------------------------------------------------------------------------
54.59   104.40   147.72   150.88   167.18   142.37    80.15   113.42    76.21     :      958.94
18.20    34.80    49.24    50.29    55.73    47.46    26.72    37.81   125.40     :      319.65
```

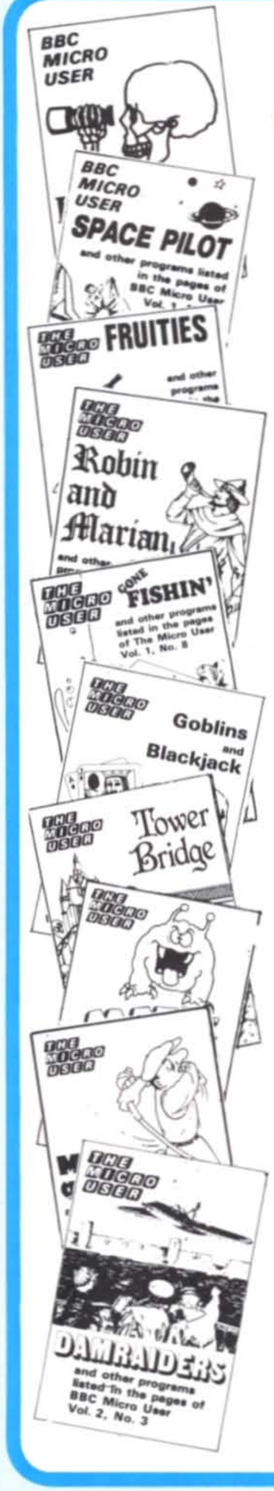
WORD PROCESSOR

```
Page 1

This is a demonstration of the
MINI OFFICE word processor
showing the various printout
options available.

e 1

is is a demonstration of the MINI
FICE word processor showing the
ious printout options available.

s a demonstration of the MINI OFFICE word proce
g the various printout options available.

emonstration of the MINI OFFICE word processor showing th
ions available.

OSE

This is a demonstrat
processor showing th
available.
```

GRAPHICS

the unbelievable price of just £5.95 CASSETTE

Also available for BBC 'B' on 5¼" disc at £7.95 and 3" disc, at £9.95 by mail order (see coupon on Page 7).


BBC MICRO USER
BBC MICRO USER
SPACE PILOT
and other programs listed in the pages of BBC Micro User Vol. 1
THE MICRO USER
FRUITIES
and other programs
THE MICRO USER
Robin and Marian
THE MICRO USER
GONE FISHIN'
and other programs listed in the pages of The Micro User Vol. 1, No. 8
THE MICRO USER
Goblins and Blackjack
THE MICRO USER
Tower Bridge
THE MICRO USER
THE MICRO USER
THE MICRO USER
DAMRAIDERS
and other programs listed in the pages of BBC Micro User Vol. 2, No. 3

ALL the programs from The Micro User from Day One are now on tape and disc!

MARCH 1983: Deathwatch, Bingo and other programs from Vol. 1, No. 1.

APRIL: King Kong, Nim, and other programs from Vol. 1, No. 2.

MAY: Air Strike, a fast and furious arcade game; Test your mental powers with **Pelmanism; Anagrams,** the word game. **Character,** generate vertical and inverted text. **Teletext,** animation in Mode 7. **Beeb,** two joystick exercises.

JUNE: Space Pilot, lost in space you must fight off repeated attacks from alien life forms. **Nomism,** you are a nomadic herdsman desperately trying to eke out a living on the plains of Africa. **Colourful Characters Plus** other listings from the June issue.

JULY: Tenpin, a simulation of Tenpin Bowling; **Spacepods,** beat the alien hordes; **Cup,** exciting 3D graphics techniques **Test** and **Steady,** programs to accompany the Beeb Body Building Course. **Breakfix,** don't let Break destroy your precious variables!

AUGUST: Fruities, driven by strange urges you climb the ladders of adventure to risk all in the gardens of unearthly frights. **Animation,** a suite of programs that really bring your screen alive; **Casdisc,** the machine code downloader for your disc system; **Mode 7** colour routines.

SEPTEMBER: Robin & Marian, rescue Maid Marian from the Sheriff of Nottingham. **Galactic Invaders,** an exciting arcade game. **DFS Benchmarks,** 14 DFS test programs. **Animation,** new techniques. **Terminal,** connect a BBC Micro to a mainframe.

OCTOBER: Fishing, a compulsive day's angling. **Joykey,** convert programs to joystick. **Pentest and Bellringer,** for Micro User lightpens. **Contours,** an educational program. **Link** BBC Micros to each other. **Plus** all the listings from the first Electron User.

NOVEMBER: Goblins, an enchanted journey. **Blackjack,** the casino favourite. **Charge** and **Pendulum,** Body Building Course part 9. **Sideways,** programs in ROMs. **Pendraw,** a light pen sketching program. **Plus** all the programs from the second Electron User.

DECEMBER: Tower, rescue London's treasure. **Santa,** help Father Christmas. **VDU 23,** an invaluable character defining utility. **Paged,** graphic techniques. **Plus** all the listings from the third issue of Electron User.

All our discs incorporate an automatic downloader. Just boot up the disc, make a choice from the menu – and away you go!

Save wear on your fingers and ensure all your programs are error-free by using our monthly tapes or discs. They are only:

£4.25 cassette
£6.25 5¼" disc
£8.25 3" disc

You can also take out a year's subscription and have them posted to you each month.

Cassette £40
5¼" disc £60
3" disc £80

JANUARY 1984: Barrels, an all-action arcade game. **Noteplay,** an entertaining musical utility. **Dump1** and **Dump2,** multitone screen dumps. All the programs from our **Sound, Beginners'** and **Graphics** articles **Plus** 12 programs from the fourth Electron User.

FEBRUARY: Invasion, the classic arcade game. **Frogs,** fun for all the family. **Engvgen,** a logic game. **Balance,** a number learning program. **Key,** single key entry for the BBC Micro **Plus** nine other programs from *The Micro User*.

MARCH: Mazemunch, block-busting arcade action. **Birthday,** family fun for our anniversary. **Derrick,** number fun for infants. **Pixelpen,** high resolution for lightpens.

APRIL: Microgolf, the simulation. **Eastermaze** and **April Fool,** seasonal games. **Seawall** and **Magic Square,** maths fun. **Filer** and **Album,** a database of sounds. **TRX1, TRX2,** RS423 driver. **Heartrate,** monitor your fitness.

MAY: Dug Dig, asteroid adventures. **Damraider,** naval action. **Envaid,** easy envelopes. **Steppers,** Body Building motor control. **Spiro,** graphics windows. **Adventure,** a trapdoor maze. **Renumber,** program utility. **Bigletter,** large type. **Memory,** RAM efficiency.

JUNE: Roadracer, 3D driving action. **Quadline,** four-in-a-line logic game. **Monitor,** machine code debugging routines. **Toolkit** 8271 disc controller explored **Areas,** easy maths. **Spell,** spelling education.

JULY: Doomrun, deep space drama. **Backgammon,** the classic board game. **Keys,** user defined key editor. **Save?** and **Tidisk,** disc utilities. **Alice1** and **Alice2,** mini-adventures. **Terminal1** and **Terminal2,** two communication programs. **Acoustic,** software for the Body Build Modem.

AUGUST: Castle, an enthralling adventure program. **Gridman,** a high speed game of strategy. **Tedit,** a superb Teletext editor. **Dsquare,** simple number fun. **Dedit,** a versatile disc editor. **Input,** the ultimate general input routine. **Bells,** Alice's mini-adventure.

SEPTEMBER: Villains, save your crystals from the evil onslaught. **Rollerball,** an intriguing game of strategy and agility. **Microterm,** comms terminal. **T/Textdump,** Mode 7 screen dump. **Numbersign,** simple number skills test for infants.

OCTOBER: Wampus, explore the labyrinth and slay the beast. **Balloon,** brave the caves, escape the Goulogs. **Splits,** split screen utility. **Pageram,** paged RAM programs. **Input1/2,** alternative inputs for the disabled. **Morecol,** extended colours. **D/A,** a waveform generator. **Integer,** direct addressing speed.

NOVEMBER: Buster, line up the diamond blocks. **Duel,** two player action. **Seaside,** picture fun for the young. **M7letters,** teletext large letters. **Dscload,** loading large disc files to &E00. **6502,** second processor programs. **Synth,** musical Body Building programs.

DECEMBER: Painter, can you paint the precipitous pyramid? **Miner,** delve into the deadly mine's depths. **Snowvad** and **Carol,** two seasonal programs. **Garden,** shape-matching for infants. **Medit,** a memory editor. **Catalog** and **Save,** useful disc utilities. **Ladders,** Alice's mini-adventure. ***Plus Omega Probe – a full length machine code arcade game.***

JANUARY: Rover, guide our retriever to his rations. **Backgammon,** an exciting two player version. **Matchwood,** shape recognition for infants. **Messages,** machine code printing. **Speedtext,** display text at different rates. **Search,** a powerful programming tool. **Second processor,** Body Building and graphics routines. ***Plus Galactic Tycoon, our superb free game.***

FEBRUARY: Helicopter Dogfight, two player action. **Craal,** dungeon adventure. **Pilot,** the CAL language. **Riddle,** your first Pilot program. **Disdump,** the ultimate disassembler. **Talker,** a powerful speech chip utility. **Change,** program tidier. **In/out** – output from assembler. All the programs from Alice, Body Building and machine games. ***Plus Atomic Protector – a full length machine code arcade game.***

MARCH: Astromines, exciting space action. **Castle,** addictive two player catapult battle. **Data Maker,** take the tedium out of entering Data. **Disc Search,** powerful string search utility. **Command,** give your BBC and Epson printer the same character set. **Break Key,** a useful routine to disable Break. All the programs from Alice and Machine code games. ***Plus Flex – a full length machine code arcade game.***

Special Offers!

- ● Any five of our monthly tapes for only £15.
- ● All 10 tapes from the 1983 issues for only £25.

THE MICRO USER
ROAD RACER
THE MICRO USER
THE MICRO USER
CASTLE OF FEAR
THE MICRO USER
VILLAINS
THE MICRO USER
HUNT THE
THE MICRO USER
THE MICRO USER
PAINTER & Miner
THE MICRO USER
ROVER
THE MICRO USER
'COPTER DOGFIGHT
THE MICRO USER
ASTRO MINES
FOR BBC MODEL B
and other programs from the pages of The Micro User Vol. 3 No. 1
EXTRA! Flex

ALL BACK ISSUES OF THE MICRO USER ARE STILL AVAILABLE – USE THIS COUPON

ALL PROGRAMS ARE NOW AVAILABLE ON 3" DISC

THE MICRO USER MAIL ORDER OFFERS ORDER FORM

Unless otherwise indicated all prices include postage, packing and VAT, and are valid until April 30, 1985

Please tick items required in box below: £ p

Micro User back issues

March 1983 £1	☐	Jan 1984 £1	☐
April 1983 £1	☐	Feb 1984 £1	☐
May 1983 £1	☐	Mar 1984 £1	☐
June 1983 £1	☐	April 1984 £1	☐
July 1983 £1	☐	May 1984 £1	☐
Aug 1983 £1	☐	June 1984 £1	☐
Sept 1983 £1	☐	July 1984 £1	☐
Oct 1983 £1	☐	Aug 1984 £1.25	☐
Nov 1983 £1	☐	Sept 1984 £1.25	☐
Dec 1983 £1	☐	Oct 1984 £1.25	☐
		Nov 1984 £1.25	☐
		Dec 1984 £1.25	☐
		Jan 1985 £1.25	☐
		Feb 1985 £1.25	☐
		Mar 1985 £1.25	☐

☐ UK. Add postage 80p per copy (5 or more £3.20) ....

☐ Overseas (surface mail) Add postage £1.50 per copy (5 or more £6)................

Airmail prices on application. Please advise issues required

TOTAL ______

*Single copies of cassettes/discs**

See Page 94 for the Special Birthday Offers.

Prices are for UK and overseas.

☐ Any 5 tapes for £15

☐ All 10 1983 tapes £25

		Tape £4.25	5¼" disc 40 track £6.25	5¼" disc 80 track £6.25	3" disc £8.25
Deathwatch	Mar 1983				
King Kong	April 1983				
Air Strike	May 1983				
Space Pilot	Jun 1983				
Tenpin	Jul 1983				
Fruities	Aug 1983				
Robin & Marian	Sep 1983				
Gone Fishin'	Oct 1983				
Blackjack/Goblins	Nov 1983				
Tower Bridge	Dec 1983				
Barrel Battle	Jan 1984				
Alien Invasion	Feb 1984				
Mazemunch	Mar 1984				
Microgolf	April 1984				
Damraiders	May 1984				
Road Racer	June 1984				
Doomrun/Backgammon	July 1984				
Castles of Fear	Aug 1984				
Villains	Set 1984				
Hunt the Wampus	Oct 1984				
Blockbuster/Duel	Nov 1984				
Painter/Miner + **Omega Probe**	Dec 1984				
Rover + **Galactic Tycoon**	Jan 1985				
'Copter Dogfight + **Atomic Protector**	Feb 1985				
Astro Mines + **Flex**	Mar 1985				

Classic Arcade Games

	Tape £5.95	5¼" disc 40 track £7.95	5¼" disc 80 track £7.95	3" disc £9.95
BBC 'B'				
Electron				

The Micro User Specials

GAMES SPECIAL

Magazine £1.95	☐
Cassette £7.95	☐
Disc A .... £7.95 5¼" £9.95 3"	☐
Disc B .... £7.95 5¼" £9.95 3"	☐
Discs A and B .... £14.00 5¼" £18.00 3"	☐
Cassette and mag £9.00	☐
Disc A and mag .... £9.00 5¼" £11.00 3"	☐
Disc B and mag .... £9.00 5¼" £11.00 3"	☐
Both discs and mag £15.00 5¼" £19.00 3"	☐

EDUCATION SPECIAL

Magazine £1.95	☐
Cassette £5.95	☐
Cassette and mag £7.00	☐
Disc .... £7.95 5¼" £9.95 3"	☐
Disc and mag .... £9.00 5¼" £11.00 3"	☐

***IMPORTANT! DISC PURCHASERS PLEASE INDICATE WHICH FORMAT**

☐ 5¼" (40 track) ☐ 5¼" (80 track) ☐ 3"

Micro User annual subscription

UK £15 ☐
EIRE £15 (Sterling) ☐
Surface mail – Rest of world £20 ☐
Air mail – Rest of world £65 ☐

Tick box if
☐ renewal Commence with .... issue TOTAL ______

Annual subscription for cassettes and discs

BBC 'B' cassette £40 ☐
● Disc ☐

● Cassette £40 ● 5¼" disc £60 ● 3" disc £80

Commence with .... (state month) TOTAL ______

Acorn Speech Extension

£29.95 ☐

TOTAL ______

Dust Covers

£3.95 ☐
(UK & Overseas) TOTAL ______

TOTAL ______

Binders

UK - £4.25 ☐
Overseas - £5.25 ☐

TOTAL ______

Getting Started in Sound and Graphics Book

£5.95 ☐

TOTAL ______

The Micro User Bibliography

● Disc ☐

● 5¼" disc £7.95 ● 3" disc £9.95 TOTAL ______

Magic Sword

Book and tape £8.95 ☐
● Book and disc ☐

● 5¼" disc £9.95 ● 3" disc £11.95 TOTAL ______

Basic II Rom

£23.50 ☐

TOTAL ______

Mini Office

BBC 'B' cassette £5.95 ☐
Electron cassette £5.95 ☐
● Disc ☐

● 5¼" disc £7.95
● 3" disc £9.95

TOTAL ______

Micro Olympics

BBC 'B' cassette £5.95 ☐
Electron cassette £5.95 ☐
● Disc ☐

● 5¼" disc £7.95
● 3" disc £9.95

TOTAL ______

Action Replay

BBC 'B' cassette £3.75 ☐

Ring Nos. required ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 (All six for £18) TOTAL ______

The Advanced User Guide

£11.50 ☐

TOTAL ______

AMX Mouse

Cassette and 40 track 5¼" disc £79.95 ☐
Cassette and 3" disc £79.95 ☐

TOTAL ______

>>> ****** When ordering discs please complete *** section at foot of this page***

TOTAL ______

Trak-ball

(Plus Body Build interface packs)

With pack 19 kit £37.94 ☐
With assembled pack 19 £43.94 ☐
With pack 20 kit £39.95 ☐
With assembled pack 20 £45.95 ☐

Trak-ball also available separately £19.99 TOTAL ______

Assembly Programming

Book only £4.95 ☐
Book and cassette £6.95 ☐

TOTAL ______

>>> ****** When ordering discs please complete *** section at foot of this page***

TOTAL ______

Detach this complete page and mail as indicated on the reverse.

Don't forget to enter your name and address overleaf!

TOTAL ______

Please allow up to 28 days for delivery.

Payment: please indicate method (✓)

☐ Access/Mastercharge/Eurocard
☐ Barclaycard/Visa

Card No.

☐ Cheque/PO made payable to Database Publications Ltd.

You can also order by phone or Prestel

- Any of the goods listed here can be ordered by telephone.
- Micronet subscribers and other users of Prestel can also use the Prestel Mailbox.

Phone orders:
061-480 0171
9am-5pm

Prestel Mailbox
Key Page 89, then send your order to:
614568383
24 hours

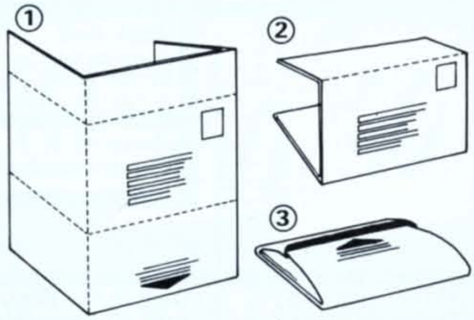
Don't forget to quote your credit card number AND your full address.

TUCK INTO FLAP

Don't forget to provide: Your address, your cheque/credit card No.
If you've ordered discs have you indicated which format?

The Micro User,
FREEPOST,
Europa House,
68 Chester Road,
Hazel Grove,
Stockport SK7 5NY.

NO
POSTAGE
NEEDED
(IF POSTED IN UK)



THE MICRO PULSE EXTERNAL ROM BOARDS

For the BBC computer

ROM BOX
MICRO PULSE
£49.95
+ VAT

Trade enquiries welcome

- BRITISH MANUFACTURE ◆ ALLOWS 8 ROMS ON LINE
- HARDWARE-BASED ROM SELECTION AVOIDS SOFTWARE INTERACTION BETWEEN UTILITY ROMS
- SWITCH TO REQUIRED ROM USING MANUAL SWITCH OUTSIDE THE UNIT
- RED LIGHTS INDICATE THE SELECTED ROM
- HIT "BREAK" TO ACCESS ROM, NO NEED TO USE SOFTWARE COMMAND
- INCLUDES ZIF SOCKET, FOR INSTANT CHANGING OF A SELECTED ROM
- INCLUDES BBC CABLE AND ROM SOCKET CONNECTOR
- INCLUDES SIMPLE FITTING INSTRUCTIONS, JUST PLUG IN AND GO!

please contact: Gareth Littler
Mark Howard or
Judith Allen at
Micro Pulse
Division

MICRO PULSE

northern computers

Churchfield Road,
FRODSHAM
Cheshire WA6 6RD
Tel: 0928 35110

NORTHERN COMPUTERS LTD
Churchfield Road, Frodsham, Cheshire WA6 6RD
Tel: 0928-35110

Supply & Service for Electron, BBC, econet network, Apple, Apricot & IBM computer systems. Exclusive Amstrad educational distributors. Industrial design & manufacture of computer-based control systems including ICI Rexagon interfaces.

Manufacturers & suppliers of MICROPULSE products:-

1. 5.25" Teac-based disc drives for BBC/Spectrum with head-load solenoids from £119 + VAT.
2. 3" compact disc drives for BBC from £129 + VAT.
3. The most comprehensive BBC DFS manual currently available (incl. free format utility disc) £6.95.
4. The BBC external ROM box £49.95 + VAT.
5. Mirror BBC cassette-to-disc utility £9 + VAT.
6. Disc-Smith BBC bit copy & repair utility £25 + VAT. *(5 & 6 available on 40 or 80 track 5.25" or 3" disc).*
7. MICROPULSE Gold floppy discs in packs of five. 40 track £7.50 + VAT. 80 track DS/DD £13.50 + VAT.
8. Youngtrainer robotics trainer + buggy P.O.A.

For further information send large SAE.

Factory shop open 9.00am-5.30pm Mon-Sat.

ADVERTISERS INDEX

A&F Software 126
Advanced Technology Products 144
Aggressive Software 162
Akhter 79
Alligata Software 136

BBC Soft 31
Beamscan 175
Beebugsoft 2, 3
Bel Tech 118, 174
Bizzell Computers 193

Cambridge Applied Technology 192
Care Electronics 105
Carson Developments 164
Chase Data 156, 157
CJE Micros 108
Clares 50, 51
Commotion 6
Compuchess 162
Computer Concepts 96, 97
Computer People 192
Contex 158
Crossware Products 192
Cumana 16, 17

Data Store 166
Datapen 162
Datastar 58
Dataware 136
Diamondsoft 193
DPS 111

Electronequip 98, 99
EMS Programming 191

Gemini Marketing 128

HCR Electronic Services 164
Hornby Software 158

Icon Software 21, 173
Integrex 78

JB International 175
JP Magnetics 160

Kempston Micro Electronics 88
Kosmos 160

L.B. Electronics 158
Leigh Computer Systems 122
Logotron 92

Mannesmann Tally 33
Mayday Software 193

Memorex 44, 45
Merlin Computer Products 142
Microdis 153
Microfax 193
Microman Computers 166
Micronet 800 112-114
Micropower 18, 19, 49, 196
Microtest 124
Microvitec 15, 34
Microware 29
Microworld 67
Microwriter 151
Miracle Technology 132

Northern Computers 191

Opus 12, 13, 26, 68, 82, 109
Oxford Computer Systems 117
P&H Electronics 104
P.R. Adby Associates 160
Pace 32, 69, 124, 195
Pastiche Software 135
PB Computer Supplies 135
Penman Products 146
Peter Donn 175
Printerland 146

Qual-Soft 152
Quest International 52

RCS 14
Ricksoft 136

S.P. Electronics 160
Security Soft 193
Servicon Dynamics 22
Silent Computers 193
Software Projects 92
Software Services 192
Solidisk 7-11
Sound & Graphics 110
Synergy Software 140
System 145

TDS 153
Technomatic 61-66
The Computer Room 166
Torch Computers 85-87
Twillstar Computers 154, 155

UCC 120, 121, 123
Unique Software 192

Viglen 175
Vine Micros 152

Watford Electronics 35-43
Willow Software 146

EMS PROGRAMMING
"EMS-BEEBGRAPH" – "NAVIGATION-AID" – "METRICATOR"
PROBLEMS WITH METRIC OR SI UNITS?

The METRICATOR suite of programs for the BBC-B and ELECTRON may be your answer. Can convert ANY unit into ANY other compatible unit eg. KM/LITRE into MILES/GAL or BTU/HOUR/FT2 into JOULES/SEC/M2. "SI" may be specified and the correct SI equivalent automatically calculated. 15 UNIQUE routines designed for EASY insertion into YOUR program give instant access to many thousands of combinations of units.

LEARNING NAVIGATION?
LIGHTS AND BUOYS RECOGNITION

NAVREC helps you learn the lights of sea going vessels, the shapes of buoys, signal code flags, marks and morse code. Altogether eight programs giving full graphic illustrations including simulated views of ship's lights at night. Question and answer tests included. This suite is great value for money and would please any nautical man.

WANTED! more programs of any sort provided they are useful, of a high standard and your own. Send yours to us for evaluation (tape, disc or sample run with instructions).

Prices (Inc p&p)

METRICATOR Tape version £6.95. 40 track disc	£9.95
Instruction manual and program listing only	£3.75
EMS-BEEBGRAPH TAPE £7.95. 40 track disc	£9.95
NAVREC 40-track disc only	£9.95

Remittance to:- "EMS Programming", 134 Buckswood Drive, Crawley, Sussex, RH11 8JG. Or send SAE for details of available programs including BEEBGRAPH – equations solver and plotter.

HEART MONITOR BBC B

Can be used as a Lie Detector, or for monitoring fitness, practising relaxation etc.
The hardware – a built and tested unit which simply plugs into the analogue port – uses an infra-red sensor to detect blood flow in your finger.
SIX screens are generated by the software which include:

A standard ECG screen which gives continuous heartbeat trace with digital pulse readout, optional ECG beep etc.

A Rate of Recovery screen which can help in assessing how fit you are by showing how fast your heartrate recovers after exercise. Full details on how to use this and all the other screens are included.

A Bio-Feedback screen which you can use to help you learn to relax, or watch other people's heart reaction to word suggestions or awkward questions etc – can be hysterically funny and often revealing.

The monitor is simple to use: the function keys provide various facilities to alter grid sizes etc., and fast: all time-critical operations are performed by machine code routines.
The monitor unit comes complete with software on cassette or disc (please state 40/80 track), and manual.

Only £37.95 inclusive (please add £2 for disc version)

Please make cheques payable to:

COMPUTER PEOPLE
30 Westholme Gardens,
Ruislip, Middlesex.

Used in schools and colleges nationwide

AD-DES
ADVENTURE DESIGNER

£9.95
BBC B
Basic II

A complete DISK-BASED Adventure writing system for the BBC computer. Write custom made adventure games with no knowledge of BASIC. The program is completely menu driven (no special language used) and the size of the game is limited only by your disk. The finished game runs independently of AD-DES and games written using this system may be sold without any obligation to us.

Cheque for £9.95 (inc. P&P) to:
UNIQUE SOFTWARE.
21. Fielding St,. Stoke-on Trent. ST4 4HD.
Telephone (0782) 412895 OR 816328 After 4:30Pm
(SPECIFY 80/40 TRACK DISK) BASIC II ONLY

COMPUTER GARDENING PROGRAMS

Two amazing programs for your BBC Model B computer

GREENFINGER:GARDEN PLANT SELECTOR

Give your BBC Model B access to information on over 400 plants. You tell the computer about growing site conditions - soil type, sunlight, moisture. The computer finds the best plants for you. Plant descriptions, flowering time, growing conditions, propogation methods etc., appear on your TV screen.

GREENFINGER:GARDEN LAYOUT PLANNER

Design your garden layout with your BBC Model B. Build up a computer model of your garden layout. Position buildings, walls, paths, patios, borders, flower beds, greenhouses, trees and shrubs. The computer plots a scaled plan on your TV complete with areas of shade! Add and delete items, pan around the layout, file and retrieve your layout for future use. Save on expensive garden purchases and building work!

Programs supplied on cassette tapes with full instructions. Each program costs £12.95 inc. P & P. Send cheque with order and name and address (BLOCK CAPITALS) to:

Cambridge Applied Technology, 51 Hinton Road, Fulbourn, Cambridge CB1 5DZ.

BEEB BODY BUILDING PACKS ORDER FORM

	Described in issue		
Pack 1	July 1983 page 83	£9.95	☐
Pack 2	July 1983 page 83	£9.95	☐
Pack 3	August 1983 page 85	£9.95	☐
Pack 4	Sept 1983 page 91	£9.95	☐
Pack 5	Sept 1983 page 91	£12.95	☐
Pack 6	October 1983 page 69	£13.65	☐
Pack 7	November 1983 page 71	£15.50	☐
Pack 8	December 1983 page 95	£16.55	☐
Pack 9	February 1984 page 123	£28.50	☐
Pack 10	March 1984 page 132	£24.95	☐
Pack 11	April 1984 page 118	£19.00	☐
Pack 12	May 1984 page 148	£24.95	☐
Pack 13	May 1984 page 148	£29.45	☐
Pack 14	July 1984 page 115	£59.95	☐
Pack 15	August 1984 page 117	£44.95	☐
Pack 16	August 1984 page 117	£8.25	☐
Pack 17	October 1984 page 149	£20.85	☐
Pack 18	December 1984 page 106	£20.85	☐
	See below		
Assembled light pen		£18.35	☐
Assembled sound to pattern converter		£22.30	☐
Assembled real time clock		£31.00	☐
Testing sound to pattern converter		£9.70	☐
Assembled pulse monitor		£25.50	☐
Assembled digital to analogue converter		£26.85	☐

Add £1 p&p per item

VAT included TOTAL £______

Please make cheques payable to Musbury Consultants and send to Musbury Consultants, 8 Fairhill, Helmshore, Rossendale, Lancs BB4 4JX.

Name______________________________

Address____________________________

____

The order form for this issue's Body Building pack may be found on page 150, and that for kits 19 and 20 may be found on page 189.

CROSSWARE
CROSS-ASSEMBLERS

FOR THE STAND-ALONE BBC MICRO

Available for the following processors:
6801/6301, 6800/6802, 6805
Z80, 8080A/8085

Phone or write for full details

Supplied on Disc from £39.95 inc VAT

CROSSWARE PRODUCTS
Melbourn, Royston, Herts SG8 6BA
Tel: 0763 60838

SOFTWARE SERVICES

NEW

The most sophisticated disc utility ever!
14 new commands for disc users. Featuring:

AUTOSAVE: For automatic program saving during development.
CLONE: The most sophisticated protected disc copier ever.
CONVERT: 40-80 track conversion on single disc.
MCOPY: Copy any number of selected files in one operation (menu driven).

FLOPPY-WISE ROM

PROTECT: Make your own discs copy proof.
RCOPY: Rename files on transfer.
ROMS: A sideways ROM management system.
Also includes – Ascii, Compare, Derrors, Dspace, Format, Prepare, Verify.

SOFTWARE SERVICES. 65 South Mossley Hill Road. Allerton, Liverpool L19 9BG.

£29.95 + £1 p&p.

Expandable console for the BBC Micro

As supplied to Universities, Colleges, Schools, Business and Home Users.

Not just a monitor/tv stand but an expansion console which gives your micro the professional look. Protects and encloses your micro with room for disc drives and 2nd. processor or teletext adapter etc., all untidy connecting wires safely out of sight within the console. Made of light yet strong aluminium with a textured finish in matching BBC colour. Available now a bolt on extra module to the console for further expansion options. YES this console will grow with your needs. Basic BBC console as shown **£44.99** + £4 carriage.

SPECIAL TORCH MODEL AVAILABLE: £46.99 + £4 carriage

Bolt on expansion module £14.99 + £2 p&p

Free security bracket to educational users on request.

Matching Printer Stand, can double for VDU Stand over the micro – only £14.99 + £2 carriage

ELECTRON CONSOLE

The console will house the ELECTRON and will safely support the expansion interfaces which will plug into the rear of the micro and will support the VDU at eye level. Tidies up all wiring between the micro, cassette and VDU. The console stores the cassette and tapes and will allow space for drives at a later date.

Electron console as shown £34.99 + £3 p&p

Mail order only - viewing by appointment
Please add 15% VAT.
For further information or send cheque to:

Silent COMPUTERS
27 WYCOMBE ROAD, LONDON N17 9XN.
TEL: 01-801 3014 (24 Hr Ansaphone)

BBC
POOLS PREDICTOR
WITH 11,000 MATCH DATABASE

FREE RACING ANALYSER

Now in its 3rd successful season, Mayday Software's Pools Predictor has been made even more powerful with a new and unique 11,000 match database. Seven separate forecasting techniques have been combined to give you the best forecasts yet. And, just as easy to use, is our new Racing Analyser. This uses the racecard from your daily paper to analyse any horse race – and it's yours for no extra charge!

BOTH PROGRAMS FOR ONLY £8.99

***** ALSO AVAILABLE FOR THE SPECTRUM ****

MAYDAY SOFTWARE
181 Portland Crescent
Stanmore, Middx. HA7 1LR.

EDUCATIONAL SOFTWARE

SPEAK/SPELL is an ingenious program for testing spelling ability. It uses the cassette to record the child's or teacher's voice.

GOODTIMES is a very useful aid in teaching children to tell the time using analogue, digital and/or 24 hour clock.

WOLFPACK is a strategy game for developing reasoning skills. Up to 50 levels of skill available, various strategies possible.

Price £9.50 each disc (state no. tracks) or £6.50 each tape.

MICROFAX LIMITED
19 Grasmere Avenue
BLACKBURN
BB1 8LD

diamondsoft
A better way of computing

Simple Single Disc Operation

No 2nd Processor Required

Purchase · Cashbook · Nominal · Sales

£27.50 + VAT per module

Business Software of the BBC microcomputer

The **complete** disc based package:
- Sales / Purchase / Nominal Ledgers
- Cashbook • VAT Accounting
- Full double entry system
- Trial Balance • Age Analyses
- Built in Database subsystem
- Fully supported

Requires the Control Module to operate which includes documentation, system and data discs on either 40 or 80 track and Database system.

BBC

Send for full details to:-
Diamondsoft Ltd., FREEPOST,
Cheadle Hulme, Cheshire SK8 5YB Tel: 061-485 8705

FOR THE BBC

STOCK CLEARANCE SALE

FLAT BED PRINTER/PLOTTER

by well known manufacturer

Only a few left

Now at only £399

SAVE £300

Please ring **095-389 592** for details

BIZZELL COMPUTERS
Walnut Tree House, Forncett St. Peter, Norwich NR16 1HR
Send a S.A.E. for our educational Software list.

TWIN1

Another disc duplicating program?
Yes, but we think that TWIN1 is the most stringent duplicator available.

Features include:
- Single pass copying, (like DFS *BACKUP).
- No need to use blank disc, (even for ELITE).
- Available on either 40 or 80 track disc, (Please state when ordering).
- Compatible with Acorn DFS, (not double density).

Please send cheque/P.O. for £9.95

SECURITY SOFT LTD.
Unit 19, Derby Trading Estate, Stores Road,
DERBY DE2 4BE. Tel: (0332) 363422.

NOTE: This duplicator must not be used to break Copyright.

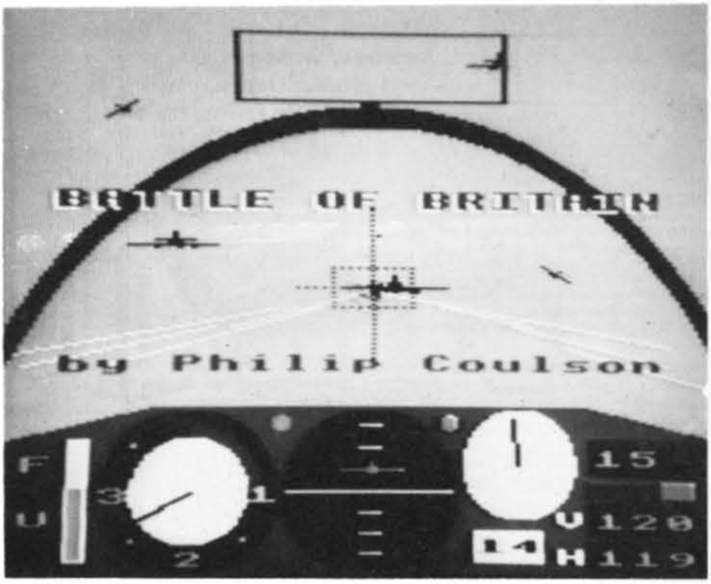
Now Available on Disc

BATTLE OF BRITAIN

for 32K BBC Model B – any operating system

Features Include:

- Mode 2 full colour graphics
- Realistic sound effects
- 3D visual effects
- Choice of skill levels
- Authentic settings and aircraft
- Full briefing
- Total mission score/high score
- Tips to improve your game
- Fuel; Oxygen; Ammunition
- Pilot's log (disc version)



Now you can fly with the Few!

Scramble your Spitfire and climb through the clouds to intercept the enemy raiders. Ground Control will guide you, but accurate flying is a must, and will score you extra points.

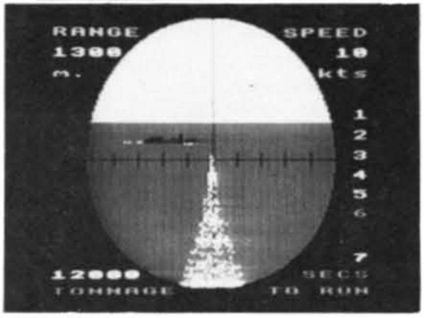
"Tally-ho!" The sky is suddenly full of planes. You get a Heinkel 111 in your sights and have to use all your skill to hold him there as he jinks and weaves to avoid the devastating fire power of your eight Browning machine guns. Your aim is good, and he explodes in flames, strewing wreckage in your path.

Watch out! Your mirror tells you there's an Me109 on your tail. You see the flashes and hear the chatter of his guns. You dive steeply away, and manage to shake him off. A Hurricane fills your sights and you almost open fire on him. That could have cost you a lot of points! Planes zoom towards you and climb and dive around you as you seek out your next target. A slow-moving Stuka falls easy prey to your guns and with your low ammo warning light flashing, you carefully aim your last few rounds at a fleeing Junkers 88.

You throttle back to conserve your dwindling fuel supply and set a course for home. From time to time, clouds blot out your view of the horizon and you are dependent on your instruments. With the airfield in sight you lower your flaps and gear and side-slip gently to line up with the runway. Although you have survived another mission, you cannot afford to relax yet, and the quality of your landing can win or lose you points.

If all this sounds too much in one go, you can opt to concentrate on just one phase of the game – interception, combat, approaches and landings – or just enjoy some stomach-churning aerobatics!

SEA WARFARE GAMES



BLOCKADE

Realistic submarine warfare game. Use your torpedoes to prevent the enemy ships reaching port with their valuable cargo. Have you the skill and judgement to sink them all and maintain the Blockade?

SUBHUNT

Aboard a destroyer in the Atlantic, protecting our convoys from the U-boats. Seek the enemy with your ASDIC, then destroy him with your depth charges – before he gets you!

★ 24 hour despatch ★ Full guarantee ★ Retail/Distributor enquiries welcome

SPECIAL OFFERS!

A. Both Sea Warfare games – 2 tapes for only **£9.95.**

B. All three games on one disc for only **£22.50.**

Unbeatable value from BETASOFT

ORDER FORM: Please print clearly and send to:
BETASOFT, 5A St. Stephens Road, Cold Norton, Chelmsford, Essex CM3 6JE

Please send me:	Tape				5¼" Disc				
	Qty	Price	P&P	Total	Qty	Price	P&P	Total	Name and Address
Battle of Britain		£9.95	30p			£14.95	35p		
Blockade		£6.95	30p						
Subhunt		£5.95	30p						
Offer A		£9.95	40p						
Offer B						£22.50	35p		
I enclose cheque/PO for: £							£		

MUSIC MICRO PLEASE!!

AVAILABLE FROM ALL LVL DEALERS. (FOR FURTHER INFORMATION TELEPHONE 0602 394000).

LVL's ECHO I is a high quality 3 octave keyboard of 37 full sized keys operating electronically through gold plated contacts. The keyboard which is directly connected to the user port of the computer does not require an independent power supply unit.

The ECHOSOFT Programme "Organ Master" written for either the BBC Model 'B' or the Commodore 64 supplied with the keyboard allows these computers to be used as real time synthesizers with full control of the sound envelopes. The pitch and duration of the sound envelope can be changed whilst playing, and the programme allows the user to create and allocate his own sounds to four pre-defined keys.

Additional programmes in the ECHOSOFT Series are in the course of preparation and will be released shortly.

Other products in the range available from your LVL Dealer are our:

ECHOKIT (£4.95)* – External Speaker Adaptor Kit, allows your Commodore or BBC Microcomputer to have an external sound output socket allowing the ECHOSOUND Speaker amplifier to be connected.

ECHOSOUND (£49.95)* – A high quality speaker amplifier with a 6" dual cone speaker and a full 6 watt output will fill your room with sound. The sound frequency control allows the tone of the sound output to be changed.

Both of the above have been specifically designed to operate with the ECHO Series keyboard.

The ECHO PRODUCT FAMILY breaks both the SOUND and PRICE BARRIERS, representing outstanding quality and value for money.

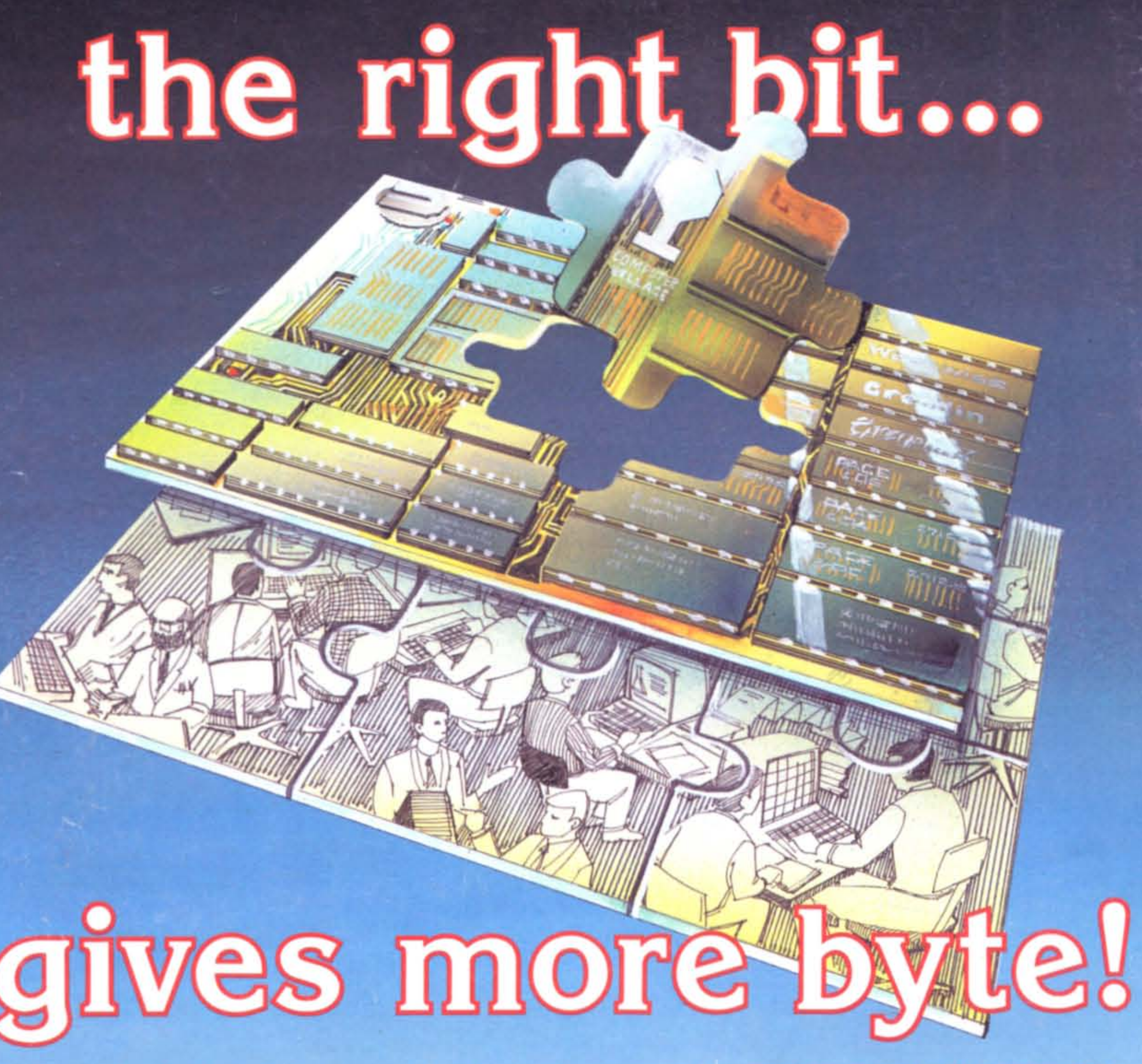
* Inclusive of VAT

ECHO I KEYBOARD	£99.95 *
ECHOSOUND AMPLIFIER	£49.95 *
ECHOKIT	£4.99 *

LVL

Scientific House,
Bridge Street, Sandiacre
Nottingham NG10 5BA
Telephone (0602) 394000

f1
f2
f3
f4
f5
f6
&
6
'
7
(
8


the right bit...
gives more byte!
COMPUTER VILLAGE

Home users, educational users, business users, scientific and engineering users, have you outgrown your BBC Microcomputer?

The BBC Micro was designed with 'an enormous potential for expansion', but for many users the puzzle of exactly how to expand it is not an easy one.

Hardware 'add-ons' are offered as the solution, but in many instances limited versatility makes this puzzle an expensive one to complete. For the home user who has grown out of the entertainment phase, and the educational and business users who require the micro to perform beyond its original design, COMPUTER VILLAGE offer you the right bit of the puzzle.

COMPUTER VILLAGE, an established company specialising in the research and production of microcomputer peripherals offer the:

CVx 16-2 ROM/RAM EXPANSION CARD

A professional, versatile and inexpensive method of expanding the memory capability of your BBC Microcomputer.

○ Easily fitted with no soldering, the card simply plugs in

○ Capacity for 16 paged ROMs, fully buffered

○ Option for up to 16k byte paged RAM, easily addressed from BASIC or assembler. Can be directly loaded from disc

○ Software initiated write protection option on RAM

○ Software switching between ROM sockets and ROM/RAM sockets, allows use of two DFS systems or other similarly titled ROMs

○ Battery backup included

○ Full documentation supplied

Available direct or from dealers nationwide at £49.95 including VAT

COMPUTER VILLAGE

Hazeldine House, Central Square, Telford, Shropshire

☎ (0952) 506771